2008 NPS Conference Session Abstracts

Abstract Title	Recent Survey Results and Approaches to Dedicated Revenue Sources for Stormwater Management	**ID**	1
Topic Area	Integrating state, federal and local funding		
Presenter	John Bliss, P.E.	**Secondary Presenter**	Thomas Brightbill, P.E.
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Abstract File

Abstract Text

Along with increased legal, procedural and technical requirements for stormwater and urban runoff management comes significantly increased revenue requirements. Several viable approaches exist within California's strict framework for taxes, fees and assessments, as structured by Proposition 13 and 218 code. These approaches must carefully balance legal requirements, technical needs and political realities. A review of special taxes, property-related fees and benefit assessments will be presented juxtaposing the legal, technical and political strengths of each one.

In most cases, public agencies will need to impose fees subject to the balloting requirements of Proposition 218. However, depending on various structural factors, some public agencies may be advised to design strategies for revenue sources, within the strict confines of Proposition 218, which do not require balloting. Such factors and scenarios will be discussed.

In both cases, a clear and rigorous understanding of the community priorities is essential. Surveys, balloting and non-balloting approaches conducted in northern and southern California in the last year have provided new insight into appropriate strategies including messaging, ballot timing, multi-agency governance, scopes of services and measure design. The results of these recent surveys and fees will be presented in context with the growing universe of public opinion polling for stormwater management including:

Survey results for two specific areas (one in Northern California and One in Southern California) will be presented and discussed. These results indicate community and demographic preferences and $ thresholds for stormwater projects and services.

2008 NPS Conference Session Abstracts

Abstract Title	Web-based GIS for sediment TMDL implementation in the Imperial Valley, California	**ID**	2
Topic Area	Water quality monitoring and data management		
Presenter	PAUL BURGESS	**Secondary Presenter**	SERENE ONG
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Abstract File

Abstract Text

State regulatory agencies, research groups and farmers organizations are participating in the development of a Spatial Data Infrastructure (SDI) that supports sediment TMDL implementation in the Imperial Valley. The team will discuss its approach to the design and development of a hydrologic GIS database and web-based mapping, data visualization and analysis tools tailored for non-point source (NPS) pollution monitoring. Data standards, sharing and stewardship issues will also be addressed insofar as they support this technical infrastructure. The presentation also focuses on stakeholder concerns about how water quality and agricultural data is used for monitoring TMDL effectiveness. The team will discuss how it is dealing with these concerns and reflect on the importance of the GIS practitioner as a neutral party who 'lets the data speak for itself.'

2008 NPS Conference Session Abstracts

Abstract Title	The Livestock and Land Program: Implementing Best Management Practices at Livestock Facilities	**ID**	3
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Jennifer Harrison	**Secondary Presenter**	
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Abstract File

Abstract Text

The purpose of Livestock and Land Program is to achieve immediate and lasting reductions in nutrient, sediment and pathogen pollution to surface and ground waters through implementation of BMPs on livestock facilities. The Livestock and Land Program utilizes an incentives based approach to achieve the cultural change needed for livestock facilities to voluntarily adopt management measures that are protective of water quality. Currently this program is offered in the counties of Santa Cruz, San Benito, South Santa Clara and Monterey and focuses on TMDL listed waterbodies in high priority watersheds including the Pajaro, Salinas and San Lorenzo. Water quality goals are achieved through implementation projects, project design, technical assistance and recruitment and training. High quality implementation projects have been developed utilizing the technical assistance of project partners to develop site plans and project designs. We have actively recruited and trained livestock owners on implementation of BMPs to accomplish regional priorities.

The Pajaro, Salinas and San Lorenzo are identified by the RWQCB as high priority watersheds in the Central Coast. There are 38 303(d) listed waterbodies for nutrients, pathogens and/or sediments in our region. There are also 17 TMDLs in development or adopted in the project region. All of these waters eventually make their way to the Monterey Bay National Marine Sanctuary and some empty directly into one of 5 ASBSs. Because of the landscape, biological functions of livestock and challenging weather conditions, livestock facilities contribute significantly to the addition of the above pollutants into local waterways. For example, in the San Lorenzo rivermouth, of the known human related pathogen sources, livestock contributes 30%.

The cultural changes achieved by this program provide immediate and lasting water quality and watershed improvements by reducing the off-site mobilization of manure, urine and sediments from livestock facilities.

2008 NPS Conference Session Abstracts

Abstract Title	The Livestock and Land Program: Implementing Best Management Practices at Livestock Facilities	**ID**	3
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Jennifer Harrison	**Secondary Presenter**	

Our approach to working with the livestock community is to identify and overcome barriers to operating in a way that's protective of water quality through the provision of technical assistance for water quality site plan completion and project design and implementation. In the 3rd year of this program in Santa Cruz, successes include: a 543% overall increase in workshop participation and a 600% increase in completion of project designs and implementation applications. We estimated having reached 30% of the livestock community in Santa Cruz, and the demand for programming continues to grow. Using data collected from our current program we estimate we have helped over 200 livestock owners manage over 10,000 tons of manure per year, which equates to over 193,000 lbs of nitrogen pollution saved. These successes are growing since we have expanded the program to include Monterey County.

In this current grant cycle we are committed to share the Livestock and Land Program statewide so that communities throughout California can improve their livestock facilities while making a positive impact on their watersheds. The 2008 California Nonpoint Source Conference is an ideal forum for this.

2008 NPS Conference Session Abstracts

Abstract Title	Multi objective management: The watershed Approach	**ID**	4
Topic Area	Developing and implementing watershed plans		
Presenter	John Lowrie	**Secondary Presenter**	
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Abstract File

Abstract Text

I am proposing to moderate a panel discussion or set of presentations highlighting CALFED Watershed Program funded projects, which best demonstrate the application of "the watershed approach" to addressing multiple resource objectives including objectives suchas non -point source pollution prevention, habitat management and restoration, and water supply management.

I can organize the panel, provide direction to the selcted presenters and as stated, moderate the panel presentations

2008 NPS Conference Session Abstracts

Abstract Title	Effectiveness of Runoff-Reducing Weather-Based Irrigation Controllers (Smart Timers)	**ID**	5
Topic Area	Water quality monitoring and data management		
Presenter	Scott Jakubowski	**Secondary Presenter**	
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Abstract Text

In the summer of 2003, the Metropolitan Water District of Orange County (MWDOC) was awarded a Proposition 13 Non-Point-Source Pollution Control Grant to provide funding assistance for the direct application of weather-based irrigation controller timer (Smart Timer) technology. As part of the study, MWDOC captured both pre- and post-Smart Timer installation water-quality and runoff flow data for two distinct neighborhoods in Orange County, California. Additionally, MWDOC conducted a water savings evaluation on those Smart Timers installed through this program. This study consisted of two parts: 1) addressing water savings due to installation of approximately 1,700 Smart Timers in Orange County over a period from September 2004 through November 2006, and 2) examining the role of Smart Timers in reducing the quantity of urban runoff and improving the water quality of the runoff during dry weather season. The following results were determined: A) Water Savings in single family residences (SFR) resulted in average water savings of 0.98 HCF/month (about 24.1 gpd; 0.006 gpd/sq.ft. of irrigated area). This is about 4.7% of the household water use. Out of the 899 residential Smart Timers evaluated, 50% showed statistically different water usage, 32% of the meters had reductions and 18% of the SFR units had increases. No statistically significant change in water use was observed in 50% of the SFR units. B) Water Savings in Commercial Settings resulted in an average saving of 9.5 HCF/month (234 gpd; 0.005 gpd/sq.ft. irrigated area) per installation. Statistically significant water savings occurred in 31%, while water use increased statistically significantly in about 11% of the commercial meters retrofitted with Smart Timers. C) Runoff Evaluation Due to Installation of Smart Timers in Irvine in the post-intervention period (200 gpd/irrigated acres) was significantly lower than that of the Control area (420 gpd/irrigated area) during dry weather months of the post-intervention period. Comparison of pre- (Year 2003) and post-intervention (Year 2006) runoff indicated a reduction in runoff flow in the Control as well as the Retrofit areas. In Lake Forest, the dry weather runoff flow during post-intervention period (Year 2006, 25,100 gpd) is about 55% lower than the runoff recorded during the pre-intervention period (Year 2005, 54,400

2008 NPS Conference Session Abstracts

Abstract Title	Effectiveness of Runoff-Reducing Weather-Based Irrigation Controllers (Smart Timers)	**ID**	5
Topic Area	Water quality monitoring and data management		
Presenter	Scott Jakubowski	**Secondary Presenter**	

gpd). This study showed that installation of Smart Timers resulted in program-wide water savings in SFR (20 gpd) and commercial (254 gpd) areas. However, evaluation of individual meter performance indicated that only about 30-32% of the Smart Timers significantly saved water during the study period. These Smart Timers installed at SFR and commercial facilities saved an average of approximately 80 gpd and 1,200 gpd, respectively.

2008 NPS Conference Session Abstracts

Abstract Title	Bacteria Source Identification Study in the North Santa Monica Bay Watersheds	**ID**	6
Topic Area	Water quality monitoring and data management		
Presenter	Nathan Stevenson	**Secondary Presenter**	
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Abstract File 090658_11152007_Nathan Ste_abstract - Source ID.doc

Abstract Text

Source control is a vital component to reducing non-point source pollution. In particular, sources of bacteria are difficult to identify due to the complexity in distinguishing between animal and anthropogenic sources. In recent years significant developments have been made in advanced analysis techniques, yet a protocol for identifying bacteria pollutant sources has remained largely unrefined.

In March 2007, the County of Los Angeles initiated a study in the North Santa Monica Bay to identify sources of bacteria contamination at two popular public beaches in the City of Malibu, Paradise Cove and Escondido Beach. In a collaborative effort between public entities, regulatory agencies, and environmental groups, scientists from the Southern California Coastal Water Research Project (SCCWRP) developed a tiered approach to bacteria source investigation. Funded by the County of Los Angeles, SCCWRP led the development of this approach by researching previous efforts in the field and combining effective elements into a robust, yet cost effective, adaptive protocol.

We believe this protocol provides a cost-effective solution to bacteria source identification and can be used as a prototype for future bacteria source identification studies.

Presentation Highlights
- Difficulty of identifying non-point bacteria sources
- Engaging the community and the administrative process
- Reference studies used in protocol development
- Bacteria study approach

o 4 tier, adaptive monitoring program
o Management decisions associated with each tier

2008 NPS Conference Session Abstracts

Abstract Title	Bacteria Source Identification Study in the North Santa Monica Bay Watersheds	**ID**	6
Topic Area	Water quality monitoring and data management		
Presenter	Nathan Stevenson	**Secondary Presenter**	

o Direct Measures: Indicator bacteria, bacteroides, library-based DNA fingerprinting
o Indirect Measures: flow rate, optical brighteners, pH

Successes
• Standard protocol transferable to any watershed
• Developed first known methodology to distinguish natural optical brighteners from man-made ones
• Overwhelming public support

2008 NPS Conference Session Abstracts

Abstract Title	Water Quality Monitoring & Stormwater BMP Treatment Effectiveness	**ID**	7
Topic Area	Assessing and evaluating project success		
Presenter	Neal Shapiro	**Secondary Presenter**	
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Abstract File 023228_11162007_Neal Shapi_NPSConf08 SanDiego Abstract.doc

Abstract Text

The City of Santa Monica has completed three major off-line urban runoff pollution mitigation projects for three of its 13 sub-watersheds (comprising the entire City watershed of 8.3 square miles). Two projects are vortex screening primary treatment of all dry weather flows and most wet weather flows followed by a year-round dry weather (low-flow) diversion to the sanitary sewer. Wet weather is only treated by the primary Best Management Practice (BMP) device. The third project is not a low-flow diversion but a gross and soluble pollutants BMP treatment train; it is a treat and release back into the storm drain line project All projects have state grant funding and water monitoring requirements. All three sub-watersheds drain into the Santa Monica Bay, a major Southern California water body and economic engine for the region.

This presentation will share the results of water quality analyses since July 2007 through the summer 2008, including dry water samples and rain event samples, if available. Wet weather samples can only be taken during regular business hours. This paper will present water quality data for a number of major pollutants commonly found in urban runoff, such as bacteria, oil and grease, heavy metals and organic chemicals. These results will assist in the evaluation of the projects' effectiveness in terms of pollutant removal efficiencies and determine BMP effectiveness whether as a single use BMP or when combined with other BMPs. Evaluation through water quality monitoring also provides important information on using the right BMPs that will provide effective stormwater and dry weather regulatory compliance, protect human health, and safeguard the aquatic environment.

The Westside Water Quality Improvement Project is a state-of-the-art BMP treatment system designed to treat urban dry weather (up to 3 cubic feet per second, cfs) and wet weather flows (up to 33 cfs) generated by the heavily-urbanized areas in the eastern portion of Santa Monica and the western portion of the City of Los Angeles. The facility began operations Fall 2006 and utilizes a combination of commercially-available off-the-shelf treatment systems that

2008 NPS Conference Session Abstracts

Abstract Title	Water Quality Monitoring & Stormwater BMP Treatment Effectiveness	**ID**	7
Topic Area	Assessing and evaluating project success		
Presenter	Neal Shapiro	**Secondary Presenter**	

utilize screening, sedimentation, and direct filtration to remove floatable trash, oil and grease, suspended sediment, herbicides and pesticides. The BMP for treating soluble pollutants, normally used to treat only during wet weather events, and lay dormant during dry weather, treats dry weather 24/7 due to the constant flow of dry weather runoff.

The Montana and Wilshire Water Quality Improvement Projects also use state-of-the-art BMP systems for dry and wet weather runoff treatment and operate 24/7. The Montana project came online late Spring 2007; Wilshire came online late Winter 2008. Both projects have similar drainage areas of 600 areas within the central and north part of the City and land uses: single-family, multi-family, and commercial; Montana is almost all single-family and some commercial. Wilshire has more multi-family and commercial properties, and more heavily traveled transportation arteries. Both have similar treatment flow standards: dry weather up to 1 cfs and wet weather up to 60 cfs.

2008 NPS Conference Session Abstracts

Abstract Title	IPSI: TVA's Integrated Pollutant Source Identification Program	**ID**	8
Topic Area	Other		
Presenter	Patricia Hamlett	**Secondary Presenter**	Justin Hunteman
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Abstract File

Abstract Text

Integrated pollutant source assessments are the most efficient and cost-effective approach to watershed improvement. For over twenty years the Tennessee Valley Authority (TVA) has been developing detailed nonpoint pollutant source (NPS) inventories to identify, quantify, and prioritize contributors to environmental problems in watersheds. These highly accurate land-use and
land-activity GIS databases provide the means to effectively prioritize and target watershed restoration funds and, thus, achieve the greatest level of pollutant reduction for the least amount of
funding. The comprehensive data — with details such as eroding roads and stream banks, livestock
sites, illegal dumps, and suspect septic systems — extracted from stereo photographs provides the
first step in determining the cause of pollution in the watershed. Data analysis transforms a dispersed, area-wide concern into a defined, site-specific problem by identifying sub-watersheds that are the greatest contributors to the pollution problem. The specific sites that contribute the greatest pollutant loads in each priority sub-watershed can then be determined. While providing a foundation for focusing efforts on priority impacted watersheds and identifying most-effective
abatement measures for meeting TMDLs, these NPS assessments also serve as documentation of nonpoint sources to support application for water quality improvement grants and to provide the stimulus for agencies, industries, interest groups, and landowners to work toward a common goal.

A case study of Oostanaula Creek Watershed in southeast Tennessee will be presented, beginning
with a description of the watershed and the NPS inventory and pollutant loading model processes,thencontinuing through the development of the watershed restoration plan.

2008 NPS Conference Session Abstracts

Abstract Title	Water Quality Monitoring & Stormwater BMP Treatment Effectiveness	**ID**	9
Topic Area	Assessing and evaluating project success		
Presenter	Neal Shapiro	**Secondary Presenter**	
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Abstract File

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Abstract Title	Water Quality Monitoring & Stormwater BMP Treatment Effectiveness	**ID**	9
Topic Area	Assessing and evaluating project success		
Presenter	Neal Shapiro	**Secondary Presenter**	

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2008 NPS Conference Session Abstracts

Abstract Title	Cumulative Successes in the California Green Gardener Ecological Landscaping Certification Programs	**ID**	10
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Kurt Hurley	**Secondary Presenter**	Armand Ruby
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Abstract File

Abstract Text

Ecology Action is implementing an innovative Green Gardener Program to achieve NPS pollution reductions through the adoption of ecological landscaping BMP's by landscaping service providers. Specifically, the program achieves increased water conservation, reductions in urban water runoff, and reductions in pesticide use by fostering a mastery of landscaping irrigation systems and alternative pest management strategies. After completion of a 20-hour vocational skills program in ecological landscaping, the program awards individual certifications to participants. Over 130 individuals have received Green Gardener certifications in the Monterey Bay Area, a region where a typical landscaping company may have an average of 35 client properties.

This program is also building market demand through consultation and promotion of demonstration landscapes and garden learning centers. The strengthened ecological landscaping skills of service providers, combined with increased public demand for those services, is accelerating mainstream adoption of NPS pollution prevention methods. Services are provided to Green Gardener program alumni and a newly developed, re-certification curriculum is in place. An assessment methodology to provide quantitative indicators on the success of NPS pollution reductions (through landscape modification and BMP implementation) is also in development.

The Green Gardener Program is a key component of the Coastal Non Point Source Grant from the State Water Resources Control Board (SWRCB), contracted to Ecology Action (EA) in March 2007 and funded by Proposition 50. The primary purpose of the program is to further ecological landscaping expertise and market demand in the Monterey Bay Area. This provides a unique and focused

2008 NPS Conference Session Abstracts

Abstract Title	Cumulative Successes in the California Green Gardener Ecological Landscaping Certification Programs	**ID**	10
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Kurt Hurley	**Secondary Presenter**	Armand Ruby

strategy to reduce the negative impacts of urban non point source pesticide, nutrient and sediment pollution entering local impaired water bodies and the Monterey Bay. The program also will assist the startup of similar Green Gardener programs in other urban California communities. The program will extend through the end of 2008.

2008 NPS Conference Session Abstracts

Abstract Title	Urban Runoff Disinfection: Marie Canyon Water Quality Improvement Project	**ID**	11
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Nathan Stevenson, P.E.	**Secondary Presenter**	
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Abstract File

Abstract Text

In August 2007, the County of Los Angeles Department of Public Works completed construction of the Marie Canyon Water Quality Improvement Project. The goal of this project was to reduce elevated bacteria levels at a public beach caused by non-point source runoff.

The Marie Canyon Water Quality Improvement Project incorporates a series of six filtraation units and two ultraviolet disinfection units to filter and eliminate bacteria from dry weather runoff. The system was provided by Clear Creek Systems, Inc. as a proporietary technology.

Marie Canyon is a small, 600 acre watershed in the North Santa Monica Bay. Although small, the land use is mixed and includes Pepperdine University, state park land, and residential developments. The public beach near the outlet of the watershed has been listed by Heal the Bay in their Anual Beach Report Card as the worst and third to worst beach in the state for bacteria levels.

The project received $954,000 in funding from the State Water Resources Control Board from Proposition 13: Non-Point Source Pollution Reduction Program. This included $750,000 for construction costs and $204,000 for personnel services such as engineering design, management, and monitoring.

Water quality monitoring data has shown that the system can effectively eliminate bacteria from dry weather runoff. We believe that this project highlights an important tool that could be widely used by stormwater managers to eliminate non-point source pollutants.

Presentation highlights:
*Project design

2008 NPS Conference Session Abstracts

Abstract Title	Urban Runoff Disinfection: Marie Canyon Water Quality Improvement Project	**ID**	11
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Nathan Stevenson, P.E.	**Secondary Presenter**	

*Monitoring results
*Public outreach and administrative process
*Public / private partnership to secure proprietary treatment system
*Lessons learned

Project Successes:
*99.9% bacteria reductions
*Zero dry weather bacteria exceedances at a public beach since implemented
*Reliable operation

2008 NPS Conference Session Abstracts

Abstract Title	Cal-SOAR: Watershed-To-The-Sea Education for California's Youth To Promote Overall Watershed Health	**ID**	12
Topic Area	Coastal Nonpoint Source Program (Prop 50)		
Presenter	Dan Haifley	**Secondary Presenter**	
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Abstract File

Abstract Text

In addition to watershed projects, resources must be secured for ocean and watershed education to California's youth. However, educators today are compelled to focus on academic achievement, relegating outdoor, environmental and ocean education to a lower priority. Therefore, there is a need to demonstrate that ocean and watershed concepts can positively contribute to academic achievement. Cal-SOAR would promote the Ocean Literacy Essential Principles and Fundamental Concepts (OLEP and FC) (www.coexploration.org/oceanliteracy) in an informal science curriculum for California schools, by demonstrating their ability to promote academic achievement. OLEP and FC has been developed by ocean science professionals to address the lack of ocean and watershed concepts in academic standards nationwide.

In 2003 OSO then-State Assemblymember Joe Simitian on Assembly Bill 1330, to study outdoor education. The study found that children who attended outdoor education had science scores 27% higher than those who did not (http://www.yni.org/yi/standards_project/pdf/AB1330summary.pdf). These results support the proposition that outdoor education can enhance academic achievement. Cal-SOAR, in partnership with the Monterey Bay National Marine Sanctuary (MBNMS), will support the academic value of on-the-water (outdoor) informal education, increase science understanding of ocean resources, and promote watershed and coastal awareness and stewardship.

2008 NPS Conference Session Abstracts

Abstract Title	Benefits of vegetated agricultural drainage ditches for water quality improvement	**ID**	13
Topic Area	Water Quality Monitoring: Trends & Advancements; Agricultural & Envir		
Presenter	Jeanette Wrysinski	**Secondary Presenter**	P. Robins
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Abstract File

Abstract Text

Widespread contamination of California water bodies by the orthophosphate insecticides diazinon and chlorpyrifos is well documented. While their use has decreased over the last few years, a concomitant increase in pyrethroid usage as a replacement insecticide has occurred. Researchers have also documented diazinon toxicity pulses in California's Central Valley due to dormant orchard drainage. Vegetated agricultural drainage ditches have been proposed as a potential management practice to improve the quality of agricultural runoff waters. They have been shown to be effective in mitigating simulated pyrethroid runoff storm events in the Mississippi Delta; however, California poses a different scenario in field management practices, winter storm vs. summer irrigation runoff, rainfall intensity, and ditch vegetation and soil types. Multiple lines of evidence will be required to determine their effectiveness as an applicable management practice in California. This project has utilized a multidisciplinary team to investigate key components of this vegetative treatment system. The research/modeling phase of this two-phase project has been completed. Phase I field research trials employed chemical analyses of temporal and spatial samples of water, sediment, and plants obtained from control (non-vegetated) and experimental ditches (two shapes with vegetation). During Phase II field demonstrations were conducted on farm sites with similar chemical analyses plus in-situ toxicity evaluations. Initial data provided baseline information for model generation to predict necessary ditch conditions for appropriate pesticide mitigation. Phase I initial results indicate an earlier onset and more complete capture of both pesticide types in vegetated ditches compared to control. The length of ditch required to decrease pesticide concentration by half was reduced by up to 44% in ditches that contained vegetation, compared to controls. Preliminary results from a mesocosm simulation study utilizing ELISA (Enzyme-Linked ImmunoSorbent Assay) techniques also demonstrated significant reductions in water concentrations of permethrin after exposure to vegetation. Phase II data will be used to validate and refine the model. Such economical and environmentally successful management practices can offer farmers, ranchers, and other

2008 NPS Conference Session Abstracts

Abstract Title	Benefits of vegetated agricultural drainage ditches for water quality improvement	**ID**	13
Topic Area	Water Quality Monitoring: Trends & Advancements; Agricultural & Envir		
Presenter	Jeanette Wrysinski	**Secondary Presenter**	P. Robins

landowners a viable on-farm option for water quality improvement.

2008 NPS Conference Session Abstracts

Abstract Title	The Nitrogen and Selenium Management Program for the Newport Bay Watershed: An Integrated, Multi-Stakeholder Approach to Address Point and Non-Point Sources	**ID**	14
Topic Area	Funding Source: Local Funds and Proposed Proposition 50/84 Funds		
Presenter	Karen Ashby	**Secondary Presenter**	
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Groundwater discharges/seepage within the Newport Bay watershed are of concern since the groundwater contains elevated levels of selenium and nitrogen. In order to address these concerns, the Regional Water Board worked with County/City, landowner/developer and environmental stakeholders to develop a comprehensive approach to address both point and non-point sources of selenium and nitrogen. This approach includes five main areas of focus to develop a watershed-wide management strategy for selenium and nitrogen including:

- Design and Implementation of a Monitoring Program
  - o Development of conceptual models
  - o Identification of sources and loads
  - o Assessment of bioavailability and impacts of selenium and nitrogen
  - o Development of a multiple lines of evidence approach for BMP implementation.

- Development and Evaluation of Best Management Practices (BMPs) and Treatment Technologies
  - o Survey of treatment technologies and a pilot test
  - o Development of a simple treatment-related model
  - o BMP implementation plan.

- Evaluation and Development of a Trading or Offset Program

- Evaluation of the Nutrient Total Maximum Daily Load
  - o Determination if the numeric targets and load allocations should be revised

2008 NPS Conference Session Abstracts

Abstract Title	The Nitrogen and Selenium Management Program for the Newport Bay Watershed: An Integrated, Multi-Stakeholder Approach to Address Point and Non-Point Sources	**ID**	14
Topic Area	Funding Source: Local Funds and Proposed Proposition 50/84 Funds		
Presenter	Karen Ashby	**Secondary Presenter**	

• Development of a Site Specific Objective for Selenium
o Determination if a site specific objective (SSO) for selenium is warranted
o Development of an SSO

This presentation will explore the approach that the stakeholders are utilizing to come together to address point and non-point source water quality concerns in an effective, integrated watershed-based manner and the lessons that have been learned four years into the five year project.

2008 NPS Conference Session Abstracts

Abstract Title	Water quality monitoring for the Irrigated Lands Regulatory Program in the Central Valley	**ID**	15
Topic Area	Agricultural Water Quality Program		
Presenter	Dania Huggins	**Secondary Presenter**	
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Abstract Text

The monitoring data collected under the Irrigated Lands Regulatory Program (ILRP) provides an overview of the baseline water quality conditions in specific subwatersheds in the Central Valley irrigated agriculture lands (Data gathered between May 2004 through October 2006). Analysis of the data provided us with information about data gaps, such as monitoring locations that require further investigation, and also about areas that warrant additional management practice implementation.

The approach for the analysis of the monitoring results was to divide the Central Valley Region into four 'Zones', with multiple monitoring sites. These Zones are generally based on distinctions that are geographic and that result in variations in topography, hydrology, and crop type.

Data was collected by monitoring for water column and sediment toxicity, pesticide, salinity, metals, pathogens, and other constituents. The standard freshwater test species for water column and sediment toxicity testing utilized in the ILRP are minnow, water flea, algae, and Hyalella. The data for water column and sediment toxicity are described as a percent of significant toxic tests from the total number of tests.

The toxic effects of organophosphate pesticides, such as diazinon and chlorpyrifos, are found in all Zones. Predominant pesticides detected in water throughout the Central Valley monitoring sites include chlorpyrifos, diazinon, simazine, diuron, and DDT/breakdown products.

Based on these results, the program is currently analyzing different strategies to prioritize water quality issues and implement management practices, as well as measure effectiveness. These strategies are being developed through the Management Plans process

2008 NPS Conference Session Abstracts

Abstract Title	Water quality monitoring for the Irrigated Lands Regulatory Program in the Central Valley	**ID**	15
Topic Area	Agricultural Water Quality Program		
Presenter	Dania Huggins	**Secondary Presenter**	
	in collaboration with the Coalition Groups.		

2008 NPS Conference Session Abstracts

Abstract Title	Setting Watershed Goals: Evaluating Tradeoffs and Forecasting Effects of Land Use Decisions	**ID**	29
Topic Area	Other		
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Abstract Text

Much work remains in California to better integrate land use decisions with storm water management, flood protection, drinking water supply reliability enhancements, and habitat protection. Land use decisions frequently have the greatest influence on whether ecosystem support services and watershed functions are sustained or jeopardized. Alas – those who make those decisions are usually the least aware of the interconnections between development and other services the watersheds provide. Individual watershed services are usually treated as isolated governmental jurisdictional responsibilities, such as water supply, housing, recreation, pollutant attenuation/filtration, wildlife management, or flood protection. Few mechanisms exist for better coordination and integration among these disparate governmental functions. By setting community-based goals that serve as guidelines to all governmental and non-governmental stakeholders in a watershed, we believe that the challenges associated with integrative watershed-based management involving multiple jurisdictions can be overcome. We will present an initial design of “desktop watersheds" coupled to cost-effective monitoring of input parameters and indicators of progress that will enable local watershed councils to forecast the downstream and upstream physical and ecological effects of their actions. The monitoring is driven by what the modelers need to make better models, what the models need as input data to forecast future conditions, and what the managers need as evidence of good or bad management. The latter cannot be known unless everyone has a clear understanding of what "good" and "bad” is. Trending toward goals is good and trending away from them is bad. The monitoring is needed to assess the trends and to generate the forecasts, which are needed to guide management, including adjusting the goals for new understanding and changing climates.

2008 NPS Conference Session Abstracts

Abstract Title	BMP implementation in Cemeteries	**ID**	30
Topic Area	Not Provided		
Presenter	Jonathon Marshall	**Secondary Presenter**	Jim Brezack
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Abstract Text

According to the 2000 National Water Quality Inventory Report by the Environmental Protection Agency (EPA), the most recently published biennial summary of water quality surveys, approximately 45 percent of surveyed U.S. water bodies are still impaired by pollution and do not meet water quality standards. A leading source of this impairment is polluted runoff. In fact, according to the Inventory, 13 percent of impaired rivers, 18 percent of impaired lake acres and 55 percent of impaired estuaries are most affected by urban and suburban storm water runoff.

As a result, federal, state and local agencies have enacted regulations to effectively manage stormwater runoff. According to the EPA, "The use of a management system that relies first on preventing degradation of receiving waters is recommended." Preventative measures are both more environmentally favorable and less costly when compared to the treatment of a polluted water body and can protect water bodies from significant pollution.

Long overlooked have been contributions and the development of Best Management Practices (BMPs) for the internment industry. The industry has over 10,000 sites located throughout the country ranging from less than one to over 600 acres. While a broad suite of stormwater BMPs have been developed for municipal and construction actions, specific application to the operations of the interment industry is currently nonexistent. This industry involves frequent excavations, stockpiles and borrow-pits, which in turn creates opportunities for slope failure, sediment runoff, and ultimately the degradation of receiving water quality.

Rolling Hills Memorial Park in Richmond, California, for example, has historically expanded its burial area without an engineered fill. Expansion at Rolling Hills followed a familiar path of excavation for burial with excess materials being placed as fill to expand usable space. Unfortunately, this resulted in what became a major slope failure accompanied by a

2008 NPS Conference Session Abstracts

Abstract Title	BMP implementation in Cemeteries	**ID**	30
Topic Area	Not Provided		
Presenter	Jonathon Marshall	**Secondary Presenter**	Jim Brezack

significant sediment release. However, Rolling Hills now lays claim to what may be the industry's first set of operational BMPs. While these stormwater management measures have been designed specifically for the industry, they have application with similar ongoing excavations and soil stockpiling.

2008 NPS Conference Session Abstracts

Abstract Title	South Fork of the Trinity River Road Decommissioning - A Strategy for Addressing a Sediment TMDL	**ID**	31
Topic Area	319(h) Nonpoint Source Program		
Presenter	Cynthia Tarwater	**Secondary Presenter**	
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Abstract Text

The South Fork of the Trinity River (SFTR) is located in Northern California, encompasses 620,000 acres and is one of the largest tributaries to the Trinity River. The SFTR is classified as a Wild and Scenic River in both the State and Federal systems and most notably, the largest un-dammed river in California. Approximately 90% of the basin is publically owned and managed by the USFS. The remaining 10% include several large private timber companies.

The SFTR was listed on California's Clean Water Act (CWA) Section 303(d) list as water quality limited due to sediment in 1992 and a TMDL was completed for this watershed by 1998. Roads have been identified as the largest source of controllable sediment in the South Fork, thus, in a watershed that may be slowly recovering from previous land management, controlling the potential for road failures through road decommissioning and stormproofing will ensure that water quality standards are sustained. Since 1996, the Trinity County Resource Conservation District (RCD) has worked in cooperation with Shasta-Trinity National Forest on a variety of road decommissions and road upgrade projects to reduce the potential impacts from the road network on the fisheries of the SFTR.

This poster presentation will highlight South Fork Trinity River TMDL implementation with photographs of road decommissioning before, during and after stream crossing excavation, challenges encountered along the way that are inherent to road decommissioning work, highlighting our cooperative relationship with the USFS and success at leveraging funding.

2008 NPS Conference Session Abstracts

Abstract Title	On-Farm Consultant Working with Imperial Valley Farmers	**ID**	44
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Al Kalin	**Secondary Presenter**	Linsey Dale
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Abstract Text

In 2001, the Regional Water Quality Control Board Region 7 (RWQCB) adopted the first Total Maximum Daily Load (TMDL) on silt and sediment in the New River and the Alamo River located in the Imperial Valley. New regulation processes began for all farmers discharging water into drain systems which ultimately flow into the rivers. Farmers and other discharging water users had two choices in how they would manage this mandatory compliance. Dischargers could either choose to work directly with the RWQCB where they would be under direct regulation, or they could join the Imperial County Farm Bureau Voluntary TMDL Compliance Program. Under the Farm Bureau program, individuals remain anonymous in RWQCB water monitoring, being monitored as a drainshed group rather than individually. In 2002, the Farm Bureau hired Imperial Valley native and local farmer, Al Kalin to serve as the program's On-Farm Consultant. With a wealth of agricultural knowledge, Al works directly with area farmers assisting them on various aspects of erosion control and implementing Best Management Practices to ensure the most effective resources are implemented on their farms. The enormous success of the TMDL Program has been a direct result of Al, working together with the farmers as their peer to change farming techniques that have been used for generations. In addition, Al works closely, along with the program's director to educate the RWQCB on farming practices and how they relate to TMDL implementation. The Imperial County Farm Bureau Voluntary TMDL Compliance Program has been the recipient of the 2004 Governor's Environmental and Economic Leadership Award and the 2006 Environmental Protection Agency's Environmental Award for Outstanding Achievement.

2008 NPS Conference Session Abstracts

Abstract Title	EVALUATING THE IMPORTANCE OF DIFFUSE EMISSIONS TO EUTROPHICATION OF THE SAN JOAQUIN RIVER	**ID**	45
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	William T. Stringfellow	**Secondary Presenter**	
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Abstract File 121134_12092007_William T._Stringfellow_CA-NPS-Conf_abstract_050508.doc

Abstract Text

The San Joaquin River (SJR) in Central California is a nutrient rich ecosystem that supports prolific phytoplankton growth. Excessive phytoplankton growth in nutrient rich systems (eutrophication) can have undesirable effects on water quality, including increasing concentrations of dissolved organic carbon (DOC) and biochemical oxygen demand (BOD). However, phytoplankton primary production is the base of the aquatic food web and sufficient phytoplankton growth is necessary to maintain stable ecosystems.

Ecosystem level studies are being conducted to understand how regional agricultural activities influence phytoplankton growth in the SJR between Los Banos and Stockton, CA (the upstream SJR area). These studies are being conducted in support of instituting a total maximum daily load (TMDL) requirement for oxygen demand which may included numeric limits on phytoplankton loads. The Upstream Dissolved Oxygen TMDL Project is using continuous monitoring for chlorophyll (a measure of algal biomass) in combination with an intensive grab sampling program to measure and model nutrient flux and algal growth in the SJR.

Collection of high resolution spatial and temporal flow and water quality data has allowed a complete picture of sources of diffuse nutrient emissions in the upstream SJR study area to be developed. This data is being combined with modeling to resolve outstanding issues related to the interaction between hydrologic processes, nutrient inputs, other environmental factors such as temperature and light, on the accumulation of phytoplankton biomass in the river.

Field data and river models indicate that hydrologic factors are major influences on observed algal growth rates and biomass yields (nutrients being typically in excess). Under experiments directed at testing river models, river flow regimes were modified and algal response was measured using continuous chlorophyll monitoring. The results of these studies and the role of continuous data in the development of diffuse emission management plans will be discussed.

2008 NPS Conference Session Abstracts

Abstract Title	Central Coast Water Quality Data Synthesis, Assessment, and Management (SAM)	**ID**	46
Topic Area	Water quality monitoring and data management		
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Abstract File

Abstract Text

The Monterey Bay National Marine Sanctuary and its watersheds are at the center of numerous ongoing long term water quality monitoring programs that include physical, chemical, and biological measurements. Monitoring programs differ in their objectives, spatial/temporal extent, parameters measured, sample matrix, monitoring frequency, and data quality. There is presently no method to effectively integrate, manage, and utilize the diverse data sets generated by regulatory agencies, academic institutions, businesses, and non-profit organizations. Consequently, a great deal of water quality data has yet to be fully analyzed across programs, parameters, and sites to address the status of water quality conditions within the Sanctuary and adjacent watersheds. Water quality data sets were collected from 14 monitoring programs that measure a total of 898 locations on the Central Coast. These data have been collated into a relational database that is compatible with the statewide Surface Water Ambient Monitoring Program (SWAMP) and coupled to a GIS. Analyses are presented to illustrate the utility of an integrated data set for investigating sources, status, and trends of non-point source pollutants on the Central Coast. This effort is an initial model for a system of ongoing data integration and reporting in the region.

2008 NPS Conference Session Abstracts

Abstract Title	Improving Surface Water Quality in the San Joaquin River Basin Through Sustainable Cotton Production	**ID**	47
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Marcia Gibbs	**Secondary Presenter**	
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Abstract File

Abstract Text

Biological Agriculture Systems in Cotton (BASIC) is an agricultural pollution prevention project administered by the Sustainable Cotton Project (SCP). BASIC reduces pollution of ground and surface waters by assisting cotton farmers seeking to reduce or eliminate their use of damaging chemicals, through a farmer-to-farmer mentoring program. The project goals included:
conversion of cotton acreage in the Northern San Joaquin Valley to BASIC management practices, reductions of insecticide and miticide use, including chlorpyrifos and all insecticides and miticides that are toxic to fish and wildlife, and reduction of synthetic fertilizers.

Through technical support and farmer-to-farmer information sharing BASIC growers have been able to reduce pesticide applications (by up to 73% of the county average) and prevent polluted run-off from farms thereby diminishing cotton's impact on California's air, water and soil resources. SCP targets conventional growers with proven strategies and then uses the experience of these successful farmers as an example to show their neighbors that it works. BASIC benefits both the ecosystem and human health and fosters relationships in the community that perpetuate responsible stewardship.

BASIC relies heavily on our partnership with University of California Cooperative Extension and the UC IPM program putting their research directly into the hands of our growers. These growers have shown that it is ecologically and economically feasible to produce high-quality, high-yield California cotton using BASIC techniques and producing what SCP growers believe is a marketable product.

Building on this success, SCP is currently working on marketing strategies for the "Cleaner Cotton" produced by the growers. They are seeking a market that brings a 10 to 15 cent per pound premium over traditionally grown cotton.

2008 NPS Conference Session Abstracts

Abstract Title	Improving Surface Water Quality in the San Joaquin River Basin Through Sustainable Cotton Production	**ID**	47
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Marcia Gibbs	**Secondary Presenter**	

2008 NPS Conference Session Abstracts

Abstract Title	Determining Treatment Wetland Flow Paths Using Water Quality Measurements and GIS	**ID**	48
Topic Area	Water quality monitoring and data management		
Presenter	Jeremy Hanlon	**Secondary Presenter**	
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Abstract Text

Wetland pond systems have been proposed as a possible best management practice (BMP) for improving the quality of agricultural drainage water before discharge into receiving waters. Monitoring the effectiveness of wetlands for the removal of sediments, nutrients, and other water quality constituents presents a considerable challenge due to the number drainage outfalls, seasonal variability of input water quality and quantity, and heavy sediment loads.

As part of our investigation of BMP practices in the Central Valley of California, we are evaluating the treatment efficacy of existing wetlands receiving agricultural drainage. A rapid method for determining preferential flow paths is useful for calculating effective reaction area and comparing BMP facilities to each other. The goal of this study was to develop a rapid method for determining the preferential flow path through a permanent wetland receiving agricultural drainage by tracking changes in multiple water quality parameters.

To determine to what extent the drainage water was mixing into the main body of the wetland, water quality data was gathered from multiple points across the wetland using a YSI Sonde 6600 to measure temperature, conductivity, pH, dissolved oxygen, turbidity, and chlorophyll fluorescence. Depth and location were acquired from a Garmin 188C GPS equipped with sonar. Water velocity and direction were collected from a Sontek Argonaut SL Doppler meter. The equipment was carried aboard a 12' boat and rowed to various points, taking measurements along the way. Software was written to bring the data from these instruments together so that it could be viewed on a laptop in real-time and recorded every ten seconds.

The data gathered by boat was plotted by position using ArcGIS desktop software. Using a geo-referenced aerial image of the pond, the shoreline was traced and used as a boundary shape for performing an inverse distance weighted interpolation of water quality parameters between measurement points. The data was then visualized as a color coded surface on the

2008 NPS Conference Session Abstracts

Abstract Title	Determining Treatment Wetland Flow Paths Using Water Quality Measurements and GIS	**ID**	48
Topic Area	Water quality monitoring and data management		
Presenter	Jeremy Hanlon	**Secondary Presenter**	

lake to show how a given parameter changes with location.

The results of this experiment showed that there was significant short-circuiting of the agricultural drainage through the wetland. When visualized as interpolated surfaces, several water quality parameters confirmed the water in the northeast corner of the wetland, the entrance, and the exit were all similar to each other and distinct from the rest of the pond. More traditional methods for discerning flow paths, using velocity and direction data, were unable to map this preferential flow path due to the relatively small pond currents and surface winds altering the motion of the boat.

This method of wetland characterization is useful for the rapid assessment of mixing efficiency without the use of dye tracers. The portability of this system allows for many wetlands to be assessed economically and rapidly or for multiple assessments to be conducted in a single system at minimal cost. As more BMP strategies are put into practice, this technique could see increased application as monitoring requirements for both engineered and natural pond systems will be necessary.

2008 NPS Conference Session Abstracts

Abstract Title	Community Involvement - Art Miles Mural Project "Creating Awareness About Watershed Management"	**ID**	49
Topic Area	Other		
Presenter	Joanne Tawfilis	**Secondary Presenter**	Fouad Tawfilis
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Abstract Text

We would like to present a workshop and demonstration on how to create community awareness by having school children and the public paint murals about watershed issues and to exhibit a series of beautiful murals already created from around the world on the topic. We have been recognized by the US EPA at a 2005 EPA CIC Conference, by the Alliance for Climate Protection and recently by the State of California Dept of Education for our efforts. This is something that can add "color" to your conference. Please see www.artmiles.org

2008 NPS Conference Session Abstracts

Abstract Title	Reducing non-point source pollution with constructed wetlands	**ID**	50
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Anthony OGeen	**Secondary Presenter**	
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Abstract File

Abstract Text

Constructed wetlands are common along the San Joaquin River in the Central Valley. Many constructed wetlands were built to restore wildlife habitat and are maintained by tailwaters from surrounding farmland. Constructed wetlands have great potential to mitigate non-point source pollution from irrigated agriculture. We studied the efficacy of using constructed wetlands to remove water quality contaminants from tailwaters. Four wetlands were monitored during the 2007 irrigation season, representing differences in size, design, and contributing area. Constructed wetlands ranged in size from 2 to 150 hectares and contributing areas varied from 300 to over 1,600 hectares. Input and output waters from constructed wetlands were collected on a weekly basis and analyzed for an extensive list of water quality contaminants. Input/output flow monitoring systems were designed and tested in order to calculate constituent loads. Nutrient, sediment, pathogen, and pesticide retention efficiencies were evaluated from input and output concentration data. Results show that certain wetlands were more efficient contaminant removal systems compared to others. All wetlands were highly effective at removing sediment (TSS). Average TSS removal efficiency was over 90%. Average P removal efficiency was low and only statistically significant at one site 20%. Average nitrate-N removal efficiency was high ranging from 40 to 90%. Groundwater monitoring indicated that nitrate removal occurred through the microbial mediated process of denitrification rather than through deep percolation into groundwater. Removal of Pyrethroid pesticides was also high ranging from 62 to 95 % depending on the compound. The concentration of E. coli in the wetland input water changed widely over the season with 58% of the samples exceeding the maximum concentration for water quality regulations in California (126 ufc/100ml). Approximately 69.0 to 93.9% of total E. coli concentration appears to be retained in the wetlands corresponding to statistically significant differences in removal efficiency at each wetland. Results demonstrate that constructed wetlands are effective filters for some contaminants. Wetland size and water residence time appear to the main factors that affect contaminant removal, however, when residence times are too long negative feedback mechanisms can occur. If water residence times become too long, high levels of

2008 NPS Conference Session Abstracts

Abstract Title	Reducing non-point source pollution with constructed wetlands	**ID**	50
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Anthony OGeen	**Secondary Presenter**	

salts, dissolved organic carbon, and biological oxygen demanding substances can be exported.

2008 NPS Conference Session Abstracts

Abstract Title	Ladera Ranch Stormwater, Sediment and Pollutant Management	**ID**	51
Topic Area	Developing and implementing watershed plans		
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Abstract File 041923_12132007_Hasan Nour_Abstract 2008 Conference.doc

Abstract Text

Rancho Mission Viejo Company, a major Southern California developer, completed the development of an area of approximately 2,400 acres known as the Ladera Ranch Planned Community (Ladera) within San Juan Creek watershed in South Orange County. The planned development recently constructed, drains into a multipurpose basin. Approximately 1800 acres of the development is draining into the Horno Creek Multipurpose Basin. This basin will achieve the following four major functions:

Stormwater: All storm events having recurrence intervals from 2 years to 100 years will be detained such that the peak developed discharges downstream of the basin will not exceed their pre-developed levels.

Urban Runoff: The Water Quality Control Basin, which is integrated within the Multipurpose Basin, is designed to capture the first flush volume produced by all rainfall events occurring 90% of the time. This is consistent with the USEPA's 90% capture rule. In addition to the water quality control basin a 2.4-mile long riparian stream is constructed within the development. The stream traverses the development and terminates in the Water Quality Control Basin. Dry weather flow is allowed to flow through the riparian stream.

Wetland: An area equivalent to 4 acres of the Water Quality Control Basin is used as a wetland mitigation area.

Sediment Transportation: To minimize the impacts of the development on the alluvial behavior of the downstream channel and the beach, conveyance facilities are planned to bypass the coarse sediment (sand and gravel) produced in the landscaped and undeveloped portions of the watershed.

2008 NPS Conference Session Abstracts

Abstract Title	Ladera Ranch Stormwater, Sediment and Pollutant Management	**ID**	52
Topic Area	Developing and implementing watershed plans		
Presenter	Hasan Nouri	**Secondary Presenter**	
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Abstract File 042758_12132007_Hasan Nour_Abstract 2008 Conference.doc

Abstract Text

Please ignore the last abstract I sent you and use this version:

Rancho Mission Viejo Company, a major Southern California developer, completed the development of an area of approximately 2,400 acres known as the Ladera Ranch Planned Community (Ladera) within San Juan Creek watershed in South Orange County. The planned development recently constructed, drains into a multipurpose basin. Approximately 1800 acres of the development is draining into the Horno Creek Multipurpose Basin. This basin will achieve the following four major functions:

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2008 NPS Conference Session Abstracts

Abstract Title	Reducing non-point source pollution with constructed wetlands	**ID**	53
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Toby O'Geen	**Secondary Presenter**	
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Abstract File

Abstract Text

Constructed wetlands are common along the San Joaquin River in the Central Valley. Many constructed wetlands were built to restore wildlife habitat and are maintained by tailwaters from surrounding farmland. Constructed wetlands have great potential to mitigate non-point source pollution from irrigated agriculture. We studied the efficacy of using constructed wetlands to remove water quality contaminants from tailwater. Four wetlands were monitored during the 2007 irrigation season, representing differences in size, design, and contributing area. Constructed wetlands ranged in size from 2 to 150 hectares and contributing areas varied from 300 to over 1,600 hectares. Input and output waters from constructed wetlands were collected on a weekly basis and analyzed for an extensive list of water quality contaminants. Input/output flow monitoring systems were designed and tested in order to calculate constituent loads. Nutrient, sediment, pathogen, and pesticide retention efficiencies were evaluated from input and output concentration data. Results show that certain wetlands were more efficient contaminant removal systems compared to others. All wetlands were highly effective at removing sediment (TSS). Average TSS removal efficiency was over 90%. Average P removal efficiency was low and only statistically significant at one site 20%. Average nitrate-N removal efficiency was high ranging from 40 to 90%. Groundwater monitoring indicated that nitrate removal occurred through the microbial mediated process of denitrification rather than through deep percolation into groundwater. Removal of Pyrethroid pesticides was also high ranging from 62 to 95 % depending on the compound. The concentration of E. coli in the wetland input water changed widely over the season with 58% of the samples exceeding the maximum concentration for water quality regulations in California (126 ufc/100ml). Approximately 69.0 to 93.9% of total E. coli concentration appears to be retained in the wetlands corresponding to statistically significant differences in removal efficiency at each wetland. Results demonstrate that constructed wetlands are effective filters for some contaminants. Wetland size and water residence time appear to the main factors that affect contaminant removal, however, when residence times are too long negative feedback mechanisms can occur. If water residence times become too long, high levels of

2008 NPS Conference Session Abstracts

Abstract Title	Reducing non-point source pollution with constructed wetlands	**ID**	53
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Toby O'Geen	**Secondary Presenter**	

salts, dissolved organic carbon, and biological oxygen demanding substances can be exported.

2008 NPS Conference Session Abstracts

Abstract Title	Sycamore Creek Riparian Recovery Program	**ID**	54
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Kerwin Russell	**Secondary Presenter**	
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Abstract File

Abstract Text

The Sycamore Creek Riparian Recovery Project was initiated to help reduce sedimentation, erosion and improve streamside habitat and water quality on Sycamore Creek, a tributary to the Santa Ana River in Riverside County. The 3,000 acre Sycamore Creek Watershed encompasses upland, grassland, riparian and wetland plant communities and provides good quality habitat for sensitive species. The project helped provide sediment and erosion control structures, improve habitat for native fish through the removal of non-native aquatic species and the reduction of non-native plants. Increased urban runoff has increased non-point source pollution and TMDL in the creek. Though increased vegetation management, sediment control and water quality testing, creek water quality has improved and native fish have been reintroduced as a result. A public education component was also provided in the form of outdoor signs and information on the restoration project and NPS pollution and the public's role in protecting local waterways from invasive plant and animal species and waste.

2008 NPS Conference Session Abstracts

Abstract Title	Modified Completion Report MONITORING PROGRAM:	**ID**	55
Topic Area	Water quality monitoring and data management		
Presenter	Clay A. Brandow	**Secondary Presenter**	
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Abstract File

Abstract Text

Modified Completion Report MONITORING PROGRAM:
Implementation and Effectiveness of the California
Forest Practice Rules Related to Water Quality Protection

By Clay A. Brandow, Peter H. Cafferata and John R. Munn
California Department of Forestry and Fire Protection

ABSTRACT

The California Forest Practice Rules (FPRs) (Title 14, California Code of Regulations) are designed to protect water quality and aquatic habitat in forested watersheds during and after silvicultural activities. The critical monitoring questions then become: 1) How often are water quality related FPRs being properly implemented?, and 2) When properly implemented, how effective are these FPRs in protecting water quality by retaining canopy and groundcover in watercourse and lake protection zones (WLPZs), by preventing erosion, by preventing sediment transport, and/or by preventing sediment transport to stream channels? The Modified Completion Report (MCR) monitoring program focused on answering these two basic questions using forensic monitoring data collected on a random selection of 281 Timber Harvesting Plans (THPs) and randomly selected sites within those THPs. The data were collected in the field primarily by the California Department of Forestry and Fire Protection Forest Practice Inspectors and were analyzed by watershed staff in Sacramento, California. Overall, the MCR monitoring study found that: 1) The rate of compliance with FPRs designed to protect water quality and aquatic habitat is high, and 2) FPRs are highly effective in preventing erosion and sediment transport to channels when they are properly implemented. There are, however, specific areas where improvements in implementation and/or effectiveness could be made. Findings of the MCR monitoring project are comparable to those of the earlier Hillslope Monitoring Program (HMP) project (Cafferata and Munn 2002).

2008 NPS Conference Session Abstracts

Abstract Title	Modified Completion Report MONITORING PROGRAM:	**ID**	55
Topic Area	Water quality monitoring and data management		
Presenter	Clay A. Brandow	**Secondary Presenter**	

This paper summarizes the MCR final report titled Modified Completion Report Monitoring Program: Implementation and Effectiveness of Forest Practice Rules related to Water Quality Protection, Monitoring Results 2001 through 2004 (Brandow, Cafferata and Munn, July 2006)," which is available on line at:

http://www.bof.fire.ca.gov/pdfs/MCRFinal_Report_2006_07_7B.pdf

KEY TERMS: water quality, aquatic habitat, forestry, monitoring, streams, California Forest Practice Rules (FPRs) (Title 14, California Code of Regulations), Timber Harvesting Plans (THPs) watercourse and lake protection zones (WLPZs), roads, watercourse crossings, WLPZ canopy, groundcover, erosion, sediment transport, and sediment transport to channels.

2008 NPS Conference Session Abstracts

Abstract Title	The Agriculture Water Quality Alliance: A Model for Integrated Management	**ID**	80
Topic Area	Assessing and evaluating project success		
Presenter	Lisa Lurie	**Secondary Presenter**	
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Abstract Text

The Agriculture Water Quality Alliance (AWQA) is a unique model of integrated watershed management. AWQA is a regional partnership working to reduce nonpoint source pollution from 3.5 million acres of agricultural operations and rural lands spanning six counties that drain to the Monterey Bay National Marine Sanctuary (Sanctuary). AWQA was created in 1999 to implement the Sanctuary's Agriculture and Rural Lands Plan, which outlines voluntary strategies for improving agricultural water quality. AWQA is guided by a Steering Committee consisting of five main partners: Monterey Bay National Marine Sanctuary, Natural Resources Conservation Service, Resource Conservation Districts from the six counties, University of California Cooperative Extension, and the Central Coast Agricultural Water Quality Coalition (a non-profit organization representing six Central Coast County Farm Bureaus).
AWQA adds value to the individual efforts of each of its partner organizations by identifying information and resource gaps, facilitating the transfer of knowledge between partners, and coordinating efforts to maximize impacts. The alliance looks to the agricultural community to define issues and needs, and then turns to the relevant resource agencies, non-profits, and research institutions to meet those needs in a strategic manner.

Over the last 8 years AWQA has made great strides in engaging regional stakeholders in a collaborative effort to improve agricultural water quality. Some examples of its successes include:
• the formation of watershed working groups comprising over 600 farmers which identify watershed resource management needs and priorities,
• education and outreach on farm water quality planning to over 70% of the region's growers,
• technical assistance on installing management practices to improve water quality,
• streamlined permit programs to reduce barriers to practice implementation, and
• hosting nationally significant conferences on the interface of agriculture and the environment to encourage innovation in addressing the most pressing issues related to

2008 NPS Conference Session Abstracts

Abstract Title	The Agriculture Water Quality Alliance: A Model for Integrated Management	**ID**	80
Topic Area	Assessing and evaluating project success		
Presenter	Lisa Lurie	**Secondary Presenter**	

agricultural water quality today.

In addition to providing strategic regional planning and implementation resources, AWQA also strives to monitor its impact on improving water quality at the farm- and watershed-levels. AWQA is currently testing innovative approaches to evaluating its impact by defining appropriate and measurable indicators of success.

2008 NPS Conference Session Abstracts

Abstract Title	NPS Encyclopedia	**ID**	81
Topic Area	Other		
Presenter	Molly Munz	**Secondary Presenter**	
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Abstract File 073640_01072008_Molly Munz_2008NPSConf_postr_abst_SWRCB_NPS_Encycl.doc

Abstract Text

The NPS Encyclopedia is a free on-line reference guide designed to facilitate a basic understanding of nonpoint source (NPS) pollution control and to provide quick access to essential information from a variety of sources by providing direct hyperlinks to resources available on the World Wide Web (WWW). References pertaining to hyperlinks can be accessed simply by selecting (clicking) on the blue underlined font. The purpose of this on-line resource guide is to support the implementation and development of NPS total maximum daily loads (TMDLs) and watershed (action) plans with a goal of protecting high-quality waters and restoring impaired waters. The NPS Encyclopedia's companion tool, the MP Miner, allows users to cull data from studies of management practices (peer reviewed and others) by filtering studies using two relevant site-specific variables such as slope, salinity, flushing and soil type. The MP Miner and the NPS Encyclopedia use the same designations for land use category and management practices which are similar to those identified by United States Environmental Protection Agency (USEPA 2000) in their Plan for California's Nonpoint Source Pollution Control Program.

The NPS Encyclopedia is not directly applicable to any point-source discharger that is regulated under the Clean Water Act, including activities or facilities that are under a National Pollutant Discharge Elimination System permit including those entities covered by a municipal stormwater permit, and confined animal facilities that are Concentrated Animal Feeding Operations, as defined by the United States Environmental Protection Agency.

The guidance is organized around six (6) land-use categories:

1. agriculture
2. forestry
3. urban
4. marinas and recreational boating
5. stream channel modification and riparian habitats (includes USEPA hydromodification)
6. wetlands and vegetated treatment systems

The home page for the NPS Encyclopedia contains a description on how to use the reference

2008 NPS Conference Session Abstracts

Abstract Title	NPS Encyclopedia	**ID**	81
Topic Area	Other		
Presenter	Molly Munz	**Secondary Presenter**	

document, its purpose, and an index of each land use category; applicable and relevant federal, state and local laws, policies and ordinances; and general resources (both technical and financial). Each land-use category web page contains an index of relevant management measures, general technical and financial resources, programs, and references. Each management measure web page describes the management measure in detail, lists each relevant management practice, provides specific (technical and financial) resources, and describes relevant programs and references. Web pages for all of the management measures can be accessed through an index located on the NPS Encyclopedia home page, as well as on each relevant land-use category main page.
This presentation is an information item as the NPS Encyclopedia has recently been updated and put on the WWW. Kathleen Groody (SWRCB) would like to discuss the NPS Encyclopedia's companion tool, the MP Miner during the same session. We plan to have a computer or computer stations set up to demonstrate these tools. We would like interested people to have the ability to navigate through these tools using computer terminals. We will have a suggestion board or box adjacent to these posters so that we can obtain feedback to help guide us in the development of these on-line resources.

2008 NPS Conference Session Abstracts

Abstract Title	Rethinking Stormwater Management One Block at a Time: The Elmer Avenue Neighborhood Retrofit Project	**ID**	82
Topic Area	Integrating state, federal and local funding		
Presenter	Edward Belden	**Secondary Presenter**	
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Abstract File

Abstract Text

The Los Angeles Basin Water Augmentation Study is a long-term research project led by the Los Angeles & San Gabriel Rivers Watershed Council in partnership with eight local, state, and federal agencies. The study is evaluating the practical potential to improve surface water quality and increase local groundwater supplies through infiltration of urban storm water runoff. Initiated in 2000, the study addresses a number of questions to better characterize the benefits of storm water capture and infiltration, including implications for NPDES and TMDL compliance; long-term impacts of infiltration on the vadose zone and groundwater quality and quantity; social and environmental benefits; and appropriate geographic, geologic, and hydrologic conditions for infiltration.

To evaluate water quality impacts, water samples were collected from surface runoff, infiltrating storm water in the vadose zone, and groundwater wells at six sites throughout the Los Angeles Area. Samples were analyzed for a variety of constituents including biological indicators, metals, organic compounds, and emerging compounds such as perchlorate. Data collected to date indicate that there is no evidence of significant degradation of groundwater from infiltration of storm water-borne pollutants. Groundwater quality actually improved for some constituents at sites with shallow groundwater.

Based on the positive results of the study we have begun to implement a neighborhood project to demonstrate an integrated, comprehensive approach to water management by retrofitting a residential street with strategies to address water conservation, pollution reduction and treatment, flooding, and habitat restoration. The project is located in a flood prone and open space deficient portion of Sun Valley in the City of Los Angeles. This demonstration project is unique in that is going beyond the public right of way to include features on private property that will feed into the larger project components within the public right of way. The demonstration project will include the use of stormwater infiltration,

2008 NPS Conference Session Abstracts

Abstract Title	Rethinking Stormwater Management One Block at a Time: The Elmer Avenue Neighborhood Retrofit Project	**ID**	82
Topic Area	Integrating state, federal and local funding		
Presenter	Edward Belden	**Secondary Presenter**	

permeable surfaces, rain gardens, and drought-tolerant landscaping to promote water conservation, reduce storm flows, and enhance the community. This project will serve to demonstrate the multiple benefits that may be achieved with alternative approaches to managing runoff.

This presentation will focus on the process prior to construction in Summer of 2008 to ensure successful implementation. This will include the steps taken to integrate the neighborhood residents and the various participating funding partners in the project: from the selection of the site, participation of residents in the design, development of the design, coordination of a construction project on public and private property, funding of project from multiple partners, using public and private construction teams, and continued monitoring of the site. Project designs, hydrological analyses, and targeted constituents will be presented.

2008 NPS Conference Session Abstracts

Abstract Title	Watershed management of chlorpyrifos in runoff by sorption to soil and plants in vegetated drainage	**ID**	83
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Mathew Rogers	**Secondary Presenter**	
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Abstract File 114456_01082008_Mathew Rog_2008 NPS Conference Abstract_MRogers.doc

Abstract Text

Constructed wetlands and vegetated drainage ditches have been proposed as best management practices (BMPs) for the control of non-point source chlorpyrifos in agriculturally dominated watersheds. There are currently several pilot projects examining the applicability of natural treatment systems as agricultural BMPs for chlorpyrifos in the San Joaquin Valley, but research is needed to enhance chlorpyrifos removal and to optimally site new BMPs.

Partitioning processes dominate the short-term fate of chlorpyrifos in aqueous ecosystems. Sorption to soil and aquatic plants has been measured as an important sink for chlorpyrifos, however, sorption to emergent plants has not been characterized. The adsorption of chlorpyrifos to soils in the San Joaquin Valley has not been characterized.

Sorption isotherms to two soils and five plants were determined by batch equilibrium technique. Sorption to plants (Kd = 571.1-1303.4 L kg-1) was more than 10 times higher than to soil (Kd = 40.0-71.4 L kg-1). Chopped plant material had Kd values 7.6 to 96.2 percent greater than whole stems. Chlorpyrifos sorption reached equilibrium in less than 16 hours, more rapidly than the reaction rates for biotic and abiotic degradation reactions. The strong partitioning to plants is important in the sequestration of chlorpyrifos from runoff, reducing pulses in surface waters and allowing attenuation by slower degradation reactions.

To meet compliance with chlorpyrifos water quality criteria (WQC) on a watershed scale, it is essential to determine if enough acreage is available to devote to BMPs to achieve target chlorpyrifos reductions and where in the watershed to focus limited resources. The adsorption coefficients for plants and soil in the San Joaquin Valley are being used to model the chlorpyrifos retention in vegetated drainage ditches. The mass removal of chlorpyrifos on a per acre basis will determine the total acreage on a watershed scale needed to meet chlorpyrifos WQC. A GIS model is being used to identify sites of interest for BMP

2008 NPS Conference Session Abstracts

Abstract Title	Watershed management of chlorpyrifos in runoff by sorption to soil and plants in vegetated drainage	**ID**	83
Topic Area	Implementing agricultural, urban and other pollution control measures		
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implementation.

2008 NPS Conference Session Abstracts

Abstract Title	Non-Point Source Pollution Reduction on Agricultural Land in the Estero Americano Watershed	**ID**	84
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Patricia Hickey	**Secondary Presenter**	Lisa Hulette
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Abstract File 123740_01082008_Patricia H_Abstract_GRRCD_08.doc

Abstract Text

The Gold Ridge Resource Conservation District (GRRCD) has developed a highly successful integrated watershed management approach in its efforts to reduce agricultural non-point sources of pollution in the Estero Americano Watershed. This integrated approach brings together and leverages the technical and funding capacities of numerous private and public organizations dedicated to supporting the economic viability of local agricultural, while at the same time supporting state and federal water quality standards and programs.

Our integrated approach to watershed management, supported in the main by the North Coast Regional Water Quality Control Board (NCRWQCB), the State Coastal Conservancy, and USDA's Natural Resource Conservation Service (NRCS), targets agricultural non-point sources of pollution and develops load reduction strategies through collaborative planning efforts and mechanisms.

GRRCD's integrated watershed management approach grew out of a 205(j) watershed planning grant from the State Water Resources Control Board and USEPA, and is founded on the nine minimum elements of an effective watershed management plan outlined in USEPA's Handbook for Developing Watershed Plans to Restore and Protect Our Waters (2005). Through this initial planning process, GRRCD and its partners, including the agricultural community, were able to set goals and developed actions plans to reduce nutrient and sediment loadings in the watershed. The planning process also enabled GRRCD to build critical partnerships with other important agricultural interests and organizations in the watershed.

Over the past few years, GRRCD and its partners have developed technical and funding assistance programs for comprehensive nutrient management planning and facilities enhancements on dairies, conservation planning on rangeland, a watershed-wide riparian

2008 NPS Conference Session Abstracts

Abstract Title	Non-Point Source Pollution Reduction on Agricultural Land in the Estero Americano Watershed	**ID**	84
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Patricia Hickey	**Secondary Presenter**	Lisa Hulette

restoration initiative, watershed water quality monitoring, and the development of a sediment reduction strategy based on sediment source inventories, education and adaptive management and monitoring.

2008 NPS Conference Session Abstracts

Abstract Title	Non-Point Source Pollution Reduction on Agricultural Land in the Estero Americano Watershed	**ID**	85
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Patricia Hickey	**Secondary Presenter**	Lisa Hulette
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Over the past few years, GRRCD and its partners have developed technical and funding assistance programs for comprehensive nutrient management planning and facilities enhancements on dairies, conservation planning on rangeland, a watershed-wide riparian restoration initiative, watershed water quality monitoring, and the development of a sediment reduction strategy based on sediment source inventories, education and adaptive management and monitoring.

2008 NPS Conference Session Abstracts

Abstract Title	Use of Instrumentation and SCADA in Monitoring Nonpoint Source Pollution	**ID**	86
Topic Area	Water quality monitoring and data management		
Presenter	Barry Safa, PE	**Secondary Presenter**	Cyrus Moaveni, PE
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Abstract File

Abstract Text

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD
NONPOINT SOURCE (NPS) POLLUTION CONTROL PROGRAM
FOURTH BIENNIAL NPS CONFERENCE

INTEGRATED WATERSHED MANAGEMENT PLAN
REDUCING NONPOINT SOURCE POLLUTION

Call for Abstracts

PRESENTATION TITLE: USE OF INSTRUMENTATION AND SCADA IN MONITORING NONPOINT SOURCE POLLUTION

Authors: Cyrus Moaveni, PE and Barry Safa, PE
Primary Presenter: Barry Safa, PE

- Definition and basics of nonpoint source pollution (NPS) control – NPS Pollution is pollution that comes from many sources spread over a large area. The runoff from snow or rain carries away the natural and hum-made pollutants and depositing them into lakes, rivers, or other bodies of water that could be the source of potable water for humans or animals.
- Concepts in the reduction of NPS pollution – Reduction of NPS pollution requires measurement water quality in various points in the area, identifying the source of pollution, and taking necessary action to correct the situation.
- Monitoring of water quality as a step in the control of NPS pollution - Measuring various water quality parameters at different locations in a large watershed area can help identify the source of pollution.

2008 NPS Conference Session Abstracts

Abstract Title	Use of Instrumentation and SCADA in Monitoring Nonpoint Source Pollution	**ID**	86
Topic Area	Water quality monitoring and data management		
Presenter	Barry Safa, PE	**Secondary Presenter**	Cyrus Moaveni, PE

• Use of instrumentation and SCADA in monitoring water quality - The old way of manual sampling vs. remote electronic sampling and data transfer.
• Definition and basics of SCADA – Any system that performs Supervisory Control and Data Acquisition for data collection and control. In this case, the data collection, analysis, and reporting feature is highlighted and not the electronic control aspect.
• Typical components of a SCADA system – Remote Terminal Units (RTU) located throughout a watershed collect the water quality data from electronic samplers. This information is transmitted via radio (or other communications means as appropriate) to the central SCADA center. The software in the central system stores the water quality data, generates alarms, reports, builds historic trends, and generates other information useful in the control of NPS pollution.
• Equipment (instruments, analyzers, samplers) available for remote monitoring of water quality
• Example of components in automated water quality monitoring
Automatic samplers
Example of water quality parameters to be monitored
Types of probes and analyzers
Wireless transfer of water quality data
SCADA system software for storing water quality data, alarming, reporting, and trending of water quality

• Location of remote water quality samplers and central SCADA system – A watershed consists of many catchment areas, each tributary to a stream, or other type of water course. Monitoring the
quality of water in various streams provides the ability to narrow down the areas contributing to the pollution of water in downstream water courses.
• Steps after monitoring water quality data – Once pollution is detected in a water course, the entity monitoring the water quality can trace the area contributing to that specific type of pollution. The next step is to study the cause(s) of pollution and to find ways to mitigate the problem.
• Who benefits from NPS pollution monitoring and control – Water agencies receiving raw water from lakes, rivers, or other open water courses, benefit from NPS pollution monitoring. The public is the ultimate beneficiary.
• Who pays for the cost of monitoring system – There are various sources of funding available for monitoring and control of NPS pollution.
• Who controls the NPS pollution – In most cases, State Water Resources Control Boards have jurisdiction and control power over water resources that are used for public consumption.
• Ideas for minimization of water quality monitoring costs – Progressive Approach vs. Shotgun Approach – The Progressive Approach starts with a point on a river or lake closest to the point of water withdrawal, such as a water treatment plant. If the water quality results indicate pollution, more remote units need to be on tributary water course upstream of the first point of observation. As larger water courses branch out into smaller water courses upstream, additional equipment can be added until the area with bad pollution readings is identified. In a Shotgun Approach, remote water quality monitoring equipment is placed throughout the whole watershed and the water quality reports gathered all at the same time. This method has a higher capital costs, but produces quicker results.
• Challenges in automated monitoring water quality systems - Some challenges are:
Identifying potential pollution areas
Selection of the type of water quality instruments suitable for the area
Finding a suitable location for remote sites
Procuring right of way from the property owners for the instrument site
Providing access to the site
Availability of power source. Solar energy as an alternative. Other options?
Selection of an appropriate communication system from remote sites to the central system
Selection of appropriate software at the central computer (the “HMI”) for storing, reporting, and historical trending of data. Ability to produce alarms against a pre-determined set-points for water quality parameters.
• Conclusions

2008 NPS Conference Session Abstracts

Abstract Title	Use of Instrumentation and SCADA in Monitoring Nonpoint Source Pollution	**ID**	86
Topic Area	Water quality monitoring and data management		
Presenter	Barry Safa, PE	**Secondary Presenter**	Cyrus Moaveni, PE

2008 NPS Conference Session Abstracts

Abstract Title	The Estero Americano Watershed: Reducing Agricultural NPS through Integrated Planning	**ID**	87
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Patricia Hickey	**Secondary Presenter**	
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2008 NPS Conference Session Abstracts

Abstract Title	The Estero Americano Watershed: Reducing Agricultural NPS through Integrated Planning	**ID**	87
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Patricia Hickey	**Secondary Presenter**	

restoration initiative, watershed water quality monitoring, and the development of a sediment reduction strategy based on sediment source inventories, education and adaptive management and monitoring.

2008 NPS Conference Session Abstracts

Abstract Title	Development of Coalition Group Watershed Management Plans for the Irrigated Lands Regulatory Program	**ID**	88
Topic Area	Developing and implementing watershed plans		
Presenter	John Swanson	**Secondary Presenter**	
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Abstract Text

Monitoring data collected under the Irrigated Lands Regulatory Program (ILRP) has provided an overview of the baseline water quality conditions in specific sub-watersheds within the Central Valley of California. Monitoring results have revealed affirmed or potential impacts to water quality caused by discharges from irrigated agricultural lands (irrigation return water and storm water). Analysis of the data has provided us with information regarding areas that warrant additional management practice implementation to mitigate water quality problems. For locations where water quality standards have been repeatedly exceeded, Management Plans are being developed to address the problems.

Coalition Groups comprised of agricultural growers from the regulated community are responsible for collecting and submitting monitoring data to the Regional Board for specific watershed areas. These same groups are programmatically required to develop Management Plans when certain water quality conditions are exceeded. The intent of these plans is to document the additional actions that the group will take to reduce or eliminate the contributions to water quality degradation from agriculture. The evaluation of management practice effectiveness is a part of this process. In instances where further characterization is needed to evaluate the causes or sources of toxicity, chemical constituents, or other parameters, the Management Plans may describe investigative activities that will be performed to acquire this additional data.

2008 NPS Conference Session Abstracts

Abstract Title	Developing the Sacramento River Watershed Management Plan: A Roadmap for the Future	**ID**	89
Topic Area	Developing and implementing watershed plans		
Presenter	Mary Lee Knecht	**Secondary Presenter**	
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Abstract File

Abstract Text

The Sacramento River Watershed Program (SRWP) is currently developing a management plan—or Roadmap—for the Sacramento River Watershed. The Sacramento River is California's longest river and largest watershed, providing drinking water to two-thirds of Californians and critical to California's agricultural community. With the numerous tributaries and more than sixty local watershed partnerships in the Sacramento River Basin, a comprehensive report of the entire watershed will serve as a valuable tool to agency representatives and other stakeholders.

In recent years, the Sacramento River and its many tributaries has been the focus of many reports, projects, assessments, and management plans. This activity has provided a wealth of information about the history and current state of our watershed; yet, much of the information collected remains off the radar screen of agency heads, legislators, special interest groups, and the watershed community as a whole. The purpose of this project is to consolidate and link the great work that has been conducted by locally directed watershed management programs into a comprehensive report for the Sacramento River Watershed. This report will highlight key information about our watersheds in layman terms and provide a comprehensive look at the entire watershed. The outcome will be a living document that will provide an overall picture of the condition of the watershed, identify priorities for improving the health of the watershed, and describe a strategy for implementing those priorities. Development of the Roadmap is bring guided by a Steering Committee comprised of watershed practitioners from each of the six sub regions (see below) and other experienced representatives.

Six Sub regions
1. Waters tributary to Shasta Reservoir (Pit, McCloud, and Upper Sacramento rivers)
2. Waters tributary to Oroville Reservoir (Upper Feather River system)

2008 NPS Conference Session Abstracts

Abstract Title	Developing the Sacramento River Watershed Management Plan: A Roadmap for the Future	**ID**	89
Topic Area	Developing and implementing watershed plans		
Presenter	Mary Lee Knecht	**Secondary Presenter**	

3. West-side watersheds (Cottonwood Creek to Utah Creek)
4. Northeast-side watersheds (Clear Creek to Putah Creek)
5. Southeast-side watersheds (Yuba and American River watersheds)
6. Sacramento Valley floor

This presentation will provide an overview of this exciting planning project and describe the goals and objectives and illustrate a new tool to store data, watershed reports, and information—the Sacramento River Watershed Information Module (SWIM). SWIM will serve as a virtual library of information and allow any web user to create their own GIS maps. The presentation will also describe the development of watershed health indicators to help measure the healthy and condition of the watershed.

2008 NPS Conference Session Abstracts

Abstract Title	Intregating Watershed Management and Sustainable Features in the Orange County Great Park	**ID**	90
Topic Area	Other		
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Abstract File

Abstract Text

The Orange County Great Park is located centrally within Orange County, CA and represents one of the largest municipal parks being designed in the country today and is also embarking on being one of the most sustainable. The design team of international experts around the world is working collaboratively to provide a major regional place of significance for many generations to come.

In a broad sense, the Park is developing sustainable strategies for energy, materials, carbon footprint reductions, air quality, water and green building design. A major focus of the sustainable platform is the category of water including a major focus on flood control, water quality, water conservation, water reuse and groundwater recharge. The presentation will focus heavily on the sustainable strategies for water including the major opportunities and constraints, conceptual and preliminary designs, expected results and the integration of these features with the other aspects of the park (education, outreach, community interaction, environmental injustice programs, etc.). Collectively, the integration of each of major category of sustainability will merge in synergistic fashion to create a place that truly demonstrates the ability of development and nature functioning cohesively together.

The first portion of the presentation will focus on the Great Park (formerly the El Toro Marine Base) itself including the major elements (features), a summary of the various programs being developed and a brief history on how it came to be.

The second portion of the presentation will focus on the park's location and size within one of the most sensitive habitats in the county, the Newport Bay/San Diego Creek watershed. Due to its significant size and the extreme sensitivity of the Newport Bay, the Great Park will place a significant role in improving the quality of water that enters San Diego Creek from the 4 major tributaries that run through the park. The presentation will cover the historical drainage

2008 NPS Conference Session Abstracts

Abstract Title	Intregating Watershed Management and Sustainable Features in the Orange County Great Park	**ID**	90
Topic Area	Other		
Presenter	Patrick R. Fuscoe, P.E.	**Secondary Presenter**	

patterns of these tributaries, the influence of the major military base that buried these creeks for 60 years and the park design measures that will "daylight" the creeks to a more natural riverine state similar to the historical conditions. One of the creeks being daylighted is being converted into a 120-acre Wildlife Corridor to link the Cleveland National Forest with the Laguna Coast though the Great Park. This major significant corridor will be off-limits to human influences and will be buffered by low impacting recreational uses to ensure the success of the corridor. In addition to the surface water treatment for water quality improvement, the presentation will cover the design features to capture and store water onsite for reuse, habitat enhancement, compliance with local TMDL requirements and provide opportunities for a water quality and habitat banking program.

The third and last part of the presentation will cover some of the park's sustainable highlights covering LID/LEED applications, the use of living "green" streets, energy neutral programs and the major emphasis on material re-use from the existing demolition of the military fixtures including the massive runways.

2008 NPS Conference Session Abstracts

Abstract Title	A Grass-Roots Approach to Local Resource Concerns in Salmon Creek	**ID**	91
Topic Area	Integrating state, federal and local funding		
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The Salmon Creek Watershed, in the Bodega Hydrologic Unit, is a salmonid bearing coastal tributary located immediately north of the Bodega Marine Life Refuge Critical Coastal Area (CCA). Assessments of water quality and in-stream habitat in Salmon Creek indicate that non-point sediment delivery, diminished channel complexity, and low summer stream flows are the primary issues impairing ecological function of the stream corridor and estuary (Prunuske Chatham, Inc 2006, Gold Ridge RCD 2007). Recognizing these issues early on, the Gold Ridge Resource Conservation District (GRRCD) developed a comprehensive planning program with diverse funding partners and a truly collaborative and grass-roots approach.

Regional growth pressures in rural Sonoma County have stressed the natural resources, reduced open space, and may have harmed water quality. For the small 35 ac watershed of Salmon Creek, funding and local support were of utmost importance to addressing these concerns. With this in mind, the GRRCD and its partners leveraged funding and formed partnerships with environmental non-profits, and local, state and federal resource agencies, to develop a water resource plan that integrates natural resource concerns (water conservation , water quality, and wildlife habitat) with the interests of stakeholders and agency programmatic goals. Regulations such as total maximum daily loads (TMDLs) are also driving the need for watershed planning versus individual practices to protect water quality.
The planning process for Salmon Creek is a three phase program. These phases were as follows:

- The Salmon Creek Assessment and Restoration Plan (GRRCD, 2006)
- The Salmon Creek Estuary Enhancement Plan (Prunuske Chatham, Inc 2006)
- The Salmon Creek Integrated Watershed Management Plan (GRRCD, 2009)

The Salmon Creek Integrated Watershed Management Plan (Plan) will be completed in 2009 and combines GIS based data compilation with SWAMP compatible water quality monitoring data, sediment-related habitat data, a detailed geomorphic assessment, and other completed

2008 NPS Conference Session Abstracts

Abstract Title	A Grass-Roots Approach to Local Resource Concerns in Salmon Creek	**ID**	91
Topic Area	Integrating state, federal and local funding		
Presenter	Lisa Hulette	**Secondary Presenter**	Lauren Hammack

watershed assessments (land use and physical history, hydrologic monitoring, erosion inventory, water quality, biotic monitoring, and estuary hydrodynamics) to establish prioritized watershed conservation and enhancement projects. This Plan will bring together all studies done to date, as well as issues raised at local community planning meetings, into one living document for both the resource agencies and the landowners to use. One of the greatest benefits of this process, and the ultimate integrated Plan, is that it has brought together all the stakeholders in the communities of Bodega, Occidental and Freestone to collaborate and agree on specific goals and solutions to improve the natural resources in Salmon Creek.
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2008 NPS Conference Session Abstracts

Abstract Title	A Watershed-Based Approach to Responsible Stormwater Management	**ID**	92
Topic Area	Developing and implementing watershed plans		
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A Watershed-Based Approach to Responsible Stormwater Management

Unseen yet over a 1,000 miles long, the San Francisco infrastructure for waste and stormwater continues to be inundated by wet-weather flow, leading to pollution from combined sewer overflows, to issues with social inequity through localized flooding. In an effort to upgrade the existing infrastructure, and improve and monitor water quality, the SF Planning and Urban Research Association (SOUR) is developing a comprehensive watershed-based approach to reducing nonpoint source pollution by retrofitting the system via integrated methods utilizing physical, social, and economic approaches.

This innovative collaboration between government and public agencies, private industry, concerned citizenry, and non-government groups has integrated funding sources, as well as fostering consensus building and shared responsibility between public agencies across multiple jurisdictions.

This seminar focuses on processes and mechanisms involved in implementing responsible stormwater management practices in the Bay Area. San Francisco has tremendous opportunity to serve as a model in approaching sustainable infrastructural improvements, and it is the goal of this seminar to present a critical path for other cities facing similar infrastructural problems.

2008 NPS Conference Session Abstracts

Abstract Title	Fish Friendly Farming Environmental Certification Program	**ID**	93
Topic Area	Implementing agricultural, urban and other pollution control measures		
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Abstract Text

The Fish Friendly Farming® (FFF) program is an incentive-based method for creating and sustaining environmental quality and habitat on private land. Landowners and managers enroll in the program, learn and apply environmentally beneficial management practices and carry out restoration and erosion control projects. FFF is an effective method for reducing nonpoint pollution from private farmland.

The FFF program integrates economic use of land with the production of environmental benefits. The program's focus is the land manager as the central figure in achieving and sustaining environmental quality. This approach ensures long-term environmental improvements and sustainable agriculture. Fish Friendly Farming provides for voluntary, self-directed compliance with state and federal water quality laws, federal Endangered Species Act and pesticide and local regulations. Fish Friendly Farming (FFF) provides a comprehensive approach for farmers to restore habitat for endangered salmonid species. Many farmers are avid fisherman and interested in implementing practices that will recover salmon and steelhead populations. The fish's habitat requirements are met when farmers use the FFF program's fastidious Beneficial Management Practices (BMPs) for: soil and water conservation; restoration and revegetation of riparian corridors along both major creeks and small hillside creeks; repair and careful management of roads to reduce sediment; limited chemical use. Three resource agencies - Regions l and 2 Water Quality Control Board and the National Marine Fisheries Service and County Agricultural Commissioners provide an objective third-party certification of each site.

FFF represents a new model for collaborative efforts between government and private landowners. Since 1999, over 65,000 acres have been enrolled in the FFF program in Sonoma, Mendocino, Solano and Napa Counties. There are additional areas asking to be included in the program and there is a waiting list for our workshops in several areas. The farmer, working with technical experts from the FFF program, completes a Farm Conservation

2008 NPS Conference Session Abstracts

Abstract Title	Fish Friendly Farming Environmental Certification Program	**ID**	93
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Laurel Marcus	**Secondary Presenter**	

Plan - a comprehensive inventory and assessment of natural resources, agricultural lands and management practices. The Farm Conservation Plan is a strategy for implementing Beneficial Management Practices (BMPs) and guides the improvement of land management practices and the implementation of projects for a specific property. Each Plan is unique, addressing the features and conditions of a particular property.

The Plan documents all sediment sources and evaluates stream and river riparian corridors and water sources. Various projects such as creek restoration and revegetation, water supply facility retrofit, water conservation methods, road repair, and erosion site repair are identified in the Plan as well as changes needed in management practices to produce environmental benefits. When the Farm Conservation Plan is completed, the site is certified through a third party review of the property and the Plan. Implementation of the Farm Conservation Plan and photo-monitoring of the condition of the property continues with re-certification every 5-7 years. The FFF program continues to work with the owner to cost-share implementation of major projects.

The FFF program has received funding from the state (propositions 13, 50, 40) and federal sources (319 grants and NOAA funding).

2008 NPS Conference Session Abstracts

Abstract Title	Direct and Indirect Effects of Southern California Wildfires on Storm Water Metals and PAHs	**ID**	94
Topic Area	Other		
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Abstract Text

Periodic wildfires are a natural component of southern California's forest and scrubland and are essential to maintaining overall ecological health of these systems. However, wildfires can alter soil chemistry and storm water runoff characteristics, which can result in adverse effects to downstream water quality. The effects of fire on hydrologic response and sediment loads in Southern California have been noted for over 80 years. However, relatively less attention has been paid to the effects of post-fire runoff on downstream loading of metals and organic compounds. These compounds may be of particular interest if burned areas drain to waterbodies that are impaired for nutrient, metals, or organics. In addition to the direct effects of runoff from burned landscapes, the materials left behind in ash at the burn location can be carried away from the fire in smoke and ash. Subsequent atmospheric deposition can markedly increase the quantity of various constituents available to storm flows downwind of fires. This study begins to address this information gap by investigating the direct and indirect effects of fire on storm water metals and PAH concentrations and loads. Paired watersheds (1 burned and 1 unburned) were sampled following the 2003 Cedar Fire and the 2006 Day Fire to investigate the direct effects of post fire storm runoff. Indirect effects were evaluated by collecting storm water samples from the nearby Ballona Creek watershed, which received substantial ash fallout, but did not burn. Initial data suggests that concentrations of metals and PAHs may be 2-5 times higher in runoff from burned areas than in comparable unburned catchments. In addition, ash fallout onto unburned urban landscapes may increase storm water metals and PAH concentrations by 4 to 8 times levels typically observed. The next phase of this study will focus on development of an agreed upon regional post-fire water quality sampling program, including an implementation plan and a funding strategy. This program will ultimately allow for more effective documentation of the effects of fires, improve regional coordination, and provide a mechanism to communicate the acquired information back to managers.

2008 NPS Conference Session Abstracts

Abstract Title	Multivariate Statistical Examination of the Ventura River Watershed: a Primer for Developing TMDLs	**ID**	95
Topic Area	Water quality monitoring and data management		
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Abstract Text

The Ventura River watershed encompasses 223 square miles of mainly open space, agricultural and low density urban lands. While this watershed is comparatively less impacted by anthropogenic sources than others within Ventura County, water quality concerns still exist and various segments of the Ventura River, including the estuary and upstream tributaries, are listed as impaired for nitrogen, eutrophication, and algae. To address each of these impairments, various stakeholders will begin developing Total Maximum Daily Loads (TMDLs) in late 2008.

Prior to TMDL development, stakeholders within the watershed are attempting to better identify what parameters and/or processes are driving these impairments. As is often the case with environmental problems in general and urban runoff in particular, distinguishing individual factors from a small set of individual observations can be problematic. One mechanism for assessing the magnitude and relevance of each of these components is multivariate statistical analysis. This type of examination provides sound statistical and quantitative analysis of these potential factors and their associations, thereby providing a firmer foundation on which to begin addressing the water quality impairments.

This talk focuses on multivariate statistical examination of existing data sets derived from the Ventura County National Pollutant Discharge Elimination System (NPDES) water quality monitoring program. Future work will involve the use of real-time, in-situ probes essential for building improved models for determining concentrations and for predicting the transport and biogeochemical behavior of pollutants in watersheds.

2008 NPS Conference Session Abstracts

Abstract Title	Mitigating Pesticide Runoff from a Large Commercial Nursery	**ID**	96
Topic Area	Assessing and evaluating project success		
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Abstract File

Abstract Text

Pesticide runoff from commercial nurseries has been identified as a significant source for pesticide contamination in San Diego Creek and Upper Newport Bay. This 319(h) project was conducted to evaluate the performance and effectiveness of various best management practices (BMPs). The commercial nursery selected for this project is located in the city of Lake Forest, and has a production area of 125 acres. We measured runoff flow rates from July 2005 through March 2007 using flumes and pressure transducers. Runoff water was sampled from each site on a weekly basis, and analyzed for various pesticides.

This project experienced two relatively dry years. The 2005/2006 rainy season received a total of 8.8 inches of rain, while the 2006/2007 rainy season only saw a mere 2.1 inches of rain. The total dry weather runoff was only 6% of the total volume for the 2005-2006 year, with storm runoff contributing 94%. Even with the very dry 2006/2007 season, the contribution from dry months was only 23%, while the remainder 77% was from storm runoff. This observation highlights the overwhelming contribution from storms to the total runoff in this region.

No detectable levels of OP pesticides were ever found in the runoff. However, a range of pyrethroid insecticides were consistently detected in the runoff from all sites. Bifenthrin was always found in the runoff, often at levels higher than the other pyrethroids. Comparison between pesticide concentrations and loads highlight yet again the importance of storm runoff. For instance, bifenthrin load from the 2005/2006 rainy season was >18 times that from the dry season.

A series of BMPs were implemented at the nursery. While it was difficult to quantify the individual role of some BMPs, improved irrigation practices and the use of check dams to retain and recycle the runoff water were found to be especially useful for reducing pesticide runoff under dry weather conditions. In addition, the practice to excavate the accumulated sediment in the drainage ditches before the rainy season was found to be valuable for reducing storm induced pesticide runoff. It is estimated that on the average, after the initiation of this project, the reduction in daily bifenthrin export was >95%.

2008 NPS Conference Session Abstracts

Abstract Title	Mitigating Pesticide Runoff from a Large Commercial Nursery	**ID**	96
Topic Area	Assessing and evaluating project success		
Presenter	Jay Gan	**Secondary Presenter**	

Based on the findings from this project, the following BMPs are recommended. For dry weather months, the useful BMPs include, in the order of effectiveness: 1) efficient and uniform irrigation practices; 2) collection and retention of runoff; 3) reuse of the retained water; 4) isolation of potting mix handling areas; 5) isolation of production areas from runoff channels using curbs and berms; and 6) vegetation of drainage channels. For wet weather conditions, the useful BMPs include: 1) excavation and clean-off of the accumulated sediment in retention basins, ditches or ponds to prevent the sediment runoff; 2) cleanup of loose potting materials; and 3) use of low risk pesticides during winter months.

2008 NPS Conference Session Abstracts

Abstract Title	Restoring the Agua Hedionda Watershed With Locally Driven Goals	**ID**	97
Topic Area	Developing and implementing watershed plans		
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Abstract Text

The San Diego Regional Water Quality Control Board (RWQCB) has listed the lower portion of Agua Hedionda Creek as impaired due to excess total dissolved solids (TDS) and the Aqua Hedionda Lagoon as impaired due to sedimentation and high concentrations of indicator bacteria, and is in the process of developing Total Maximum Daily Loads (TMDLs) for the Creek and Lagoon. Impairment can be attributed to both localized sources and impacts from the upper watershed. An example of the watershed scale problem is the excess sedimentation loading to the lagoon, the result of upland land disturbing activities, streambank erosion and other hydromodification occurring within the watershed. Addressing these impacts, new hydromodification requirements are increasing throughout the region. Contrasting the water quality and hydromodification impairments are large, natural areas in the thirty-two square mile Agua Hedionda watershed that provide high quality habitat. To proactively address pending water quality and hydromodification requirements and protection issues, the City of Vista established partnerships with the Cities of San Marcos, Carlsbad, and Oceanside and the County of San Diego; hired a watershed coordinator, Ashford Engineering; and contracted with Tetra Tech to develop a Watershed Management Plan. The project is funded through a grant from the SWRCB, Proposition 40, Integrated Watershed Management Program.

As a first step, the Coordinator and Tetra Tech established a Watershed Planning Group (WPG) and a Technical Advisory Committee (TAC), and worked with the WPG to develop preliminary goals, objectives, and indicators. Indicators are measureable quantities that can be used to gage the existing health of the watershed and track progress in meeting goals and objectives.

Next, a Scoping Analysis was performed including a water quality assessment and stream characterization to support recommendations for protecting high value aquatic and terrestrial resources and restoring degraded segments. The stream characterization included a general

2008 NPS Conference Session Abstracts

Abstract Title	Restoring the Agua Hedionda Watershed With Locally Driven Goals	**ID**	97
Topic Area	Developing and implementing watershed plans		
Presenter	Stephen Carter	**Secondary Presenter**	

watershed-wide reconnaissance with joint WPG and Tetra Tech teams and a targeted stream reach characterization conducted by Tetra Tech and Ashford Engineering. Results of the Scoping Analysis were used to finalize the goals, objectives, and indicators for the subsequent watershed modeling and assessment.

Currently, Tetra Tech is conducting watershed modeling to simulate the following scenarios:

- Baseline, Existing Conditions
- Predevelopment Conditions – Assuming the entire watershed is in natural open space;
- Future Conditions- Based on projected land use and population and existing/pending regulations;
- Low-Impact Development and Best Management Practices Implementation.

Results of the modeling will be compared to the prior stream characterization and water quality assessment to guide identification of priority areas for strategy development. Strategies will include stormwater BMP retrofits and stream restoration projects, including channel restabilization and bioengineering projects to reduce impacts. They will also include land preservation and acquisition. The goals and indicators will be used, along with decision criteria such as cost effectiveness, to set priorities on actions for the Management Plan.

2008 NPS Conference Session Abstracts

Abstract Title	Effects of Wildfires in San Diego County on Water Quality and Benthic Macroinvertebrate Assemblages	**ID**	98
Topic Area	Other		
Presenter	Lilian Busse	**Secondary Presenter**	Cynthia Gorham-Test
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Abstract File

Abstract Text

The 2003 and 2007 wildfires in San Diego County burned approximately 275,000 acres and 400,000 acres respectively, mostly in the eastern portion of the county. Water chemistry and benthic samples were collected after the wildfires to assess water quality and macroinvertebrate assemblages in streams with fully burned, partially burned and non-burned watersheds. Water quality data from the first storm after the wildfires were compared with data from later storm events. Benthic macroinvertebrates samples were collected in Spring 2004, 2005, and 2007 to evaluate benthic assemblage response and recovery at burned sites compared to unburned sites and pre-fire data. The following questions were addressed: (1) Were water quality and physical habitat affected by wildfires, and if so, did the effect(s) continue throughout the winter season or just after the first storm event?; (2) Were water quality and physical habitat effects restricted to sediment loading or were other pollutants involved?; (3) Were benthic macroinvertebrate assemblages affected by the wildfires, and if so, has recovery occurred within 4 years?

2008 NPS Conference Session Abstracts

Abstract Title	Monitoring Ventura County Nonpoint Source Contributions in the Upper Malibu Creek Watershed	**ID**	99
Topic Area	Water quality monitoring and data management		
Presenter	Tommy Liddell	**Secondary Presenter**	
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Abstract File 082631_01102008_Tommy Lidd_2008 CA Non-Point Source Abstract(Final).doc

Abstract Text

As part of the USEPA approved Malibu Creek Bacteria TMDL, the Ventura County Public Works Agency (VCPWA) has initiated a monitoring program to identify contributions from the sub-watersheds that drain from Ventura County into Los Angeles County. This effort, meant not only to comply with the pending compliance monitoring plan, is a critical tool for identifying sub-watersheds with high bacteria concentrations and direct future efforts for efficient use of limited implementation funds.

The Ventura county portion of the Malibu Creek watershed covers approximately 23 square miles and includes six major sub-watersheds (from east to west: Las Virgenes, Cheseboro, Palo Camado, Medea, Lindero, and Portero). The LA Regional Water Quality Control Board identified these sub-watersheds as compliance monitoring sites for Ventura County's bacteria contribution to the greater Malibu Creek watershed. Land use within each sub-watershed ranges from highly urbanized to almost completely natural. Monitoring stations are located at the Ventura-Los Angeles county line, downstream of all inputs from Ventura county outfalls. Each sub-watershed is sampled on a weekly basis, following Standard Operating Procedures outlined in the TMDL monitoring plan.

Preliminary results show that the majority of the watersheds are ephemeral; only Medea and Lindero Creeks maintain flow during the summer. As expected, indicator bacteria counts at these two sites frequently exceed applicable water quality standards.

Further efforts will be initiated to identify specific problem areas in these two creeks, including upstream investigations cataloging human impacts that may be contributing to bacteria exceedences. VCPWA plans on maintaining this effort to maintain compliance with the TMDL, but also to collect data for pre and post-treatment analysis.

2008 NPS Conference Session Abstracts

Abstract Title	Ocean Protection in the La Jolla Shores Watershed	**ID**	100
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Nathan Schaedler, P.E.	**Secondary Presenter**	Meleah Ashford, P.E.
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Abstract File

Abstract Text

The La Jolla Shores marine environment, including the San Diego Marine Life Refuge and adjoining San Diego-La Jolla Ecological Reserve, are designated as Areas of Special Biological Significance (ASBS) and Critical Coastal Areas (CCA). They are considered to be among the most valuable coastal waters in California. Non-point and point source discharges (polluted stormwater, urban runoff, and aquaria return flows) are considered by the SWRCB to be a threat to the area's water quality. University of California, San Diego (UCSD)/Scripps Institution of Oceanography(SIO), the City of San Diego and San Diego Coastkeeper are using a collaborative approach to protect the ASBS by preparing a coastal watershed management plan, implementing best management practices (BMPs) targeted at ocean protection, conducting an ocean stewardship/public outreach program and developing an interactive information management system. The watershed addressed represents the land that drains to the two ASBS and covers an urbanized area of approximately 1,600 acres in the San Diego community of La Jolla, the campus of SIO and portions of UCSD.

As part of the La Jolla Shores ASBS Dry Weather Flow and Pollution Control Program, BMPs and their corresponding NPS Management Measures (MMs) are being implemented throughout the watershed to control non-storm water discharges and reduce or eliminate pollutant sources. The selected BMPs address watershed priority pollutants and their sources identified through site inspections, water quality testing, and land use analysis. Priority pollutants for the watershed, identified based on exceedances of water quality objectives and impacts to ASBS organisms, include metals (copper, chromium, nickel and arsenic), bacteria indicators, and turbidity (sediment). NPS sources include transportation facilities (roads and parking lots), urban and university activities (pet waste, over-irrigation, waste management), erosion from canyons and open space areas, and construction activities. The BMPs have been selected using a tiered approach based on their efficiency at source reduction, eliminating non-storm water flows, and reducing storm water pollutants. To be sustainable and reduce maintenance, the BMPs were specifically designed for passive operation. As an

2008 NPS Conference Session Abstracts

Abstract Title	Ocean Protection in the La Jolla Shores Watershed	**ID**	100
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Nathan Schaedler, P.E.	**Secondary Presenter**	Meleah Ashford, P.E.

added benefit and in support of other ASBS protection efforts, the technology is exportable to other ASBS watersheds. These BMPs include dry weather flow diversions; source controls (wash racks, trash enclosures, diversion structures, pollution prevention controls for material storage areas, restoration and erosion and sediment controls, and new sewer connections); site controls (low impact development (LID)) projects; an ecology embankment/media filter; and the Birch Aquarium sea water treatment system to eliminate non-indigenous species.

The baseline water quality data that has been collected in the watershed over the past three years will be used to demonstrate project effectiveness by comparing the data pre- and post-project implementation and up- adown-gradient of selected BMPs, in addition to cross watershed comparisons and receiving water monitoring. Pollutant load reductions for the project are estimated at 10 tons of sediment and 2 lbs of copper. In addition a 90% reduction in bacteria and diversion of 95% of the dry weather flows in the watershed is predicted for the project.

2008 NPS Conference Session Abstracts

Abstract Title	Water Quality Monitoring in the Sacramento River Watershed: Review of Findings from 1998 - 2007	**ID**	101
Topic Area	Water quality monitoring and data management		
Presenter	Claus Suverkropp	**Secondary Presenter**	
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Abstract File 093327_01102008_Claus Suve_SRWP WQ Monitoring Abstract.doc

Abstract Text

The Sacramento River Watershed Program (SRWP) has been monitoring the Sacramento River and its major tributaries since 1998, to help fill a need to better understand water quality in the watershed. In December 2006, SRWP developed a summary report to examine the first six years of monitoring efforts. Funding for the six years of monitoring totaled over $4 million and came from a US Environmental Protection Agency grant to the Sacramento Regional County Sanitation District with the District providing matching funds and services. SRWP also collaborated with monitoring efforts of other agencies including the Central Valley Regional Water Quality Control Board and California Department of Waters Resources.

The goals of the monitoring program were to develop a cost-efficient, coordinated monitoring program that assessed baseline conditions in the Sacramento River's main stem and its tributaries; one that identified causes, effects and extent of problems; and one that could be used to measure improvements in management. Following the recommendations of the SRWP Monitoring Committee (comprised of agency representatives and stakeholders), SRWP chose a broad array of water quality indicators:

Physical parameters (temperature, suspended sediment, pH)
Pesticides (insecticides and herbicides)
Drinking water constituents (organic carbon)
Pathogen indicators (fecal coliform, E.coli)
Aquatic toxicity
Trace metals
Mercury (elemental mercury and methylmercury)
Monitoring fish tissue for historic chemicals and mercury
Nutrients (nitrogen and phosphorus compounds)

2008 NPS Conference Session Abstracts

Abstract Title	Water Quality Monitoring in the Sacramento River Watershed: Review of Findings from 1998 - 2007	**ID**	101
Topic Area	Water quality monitoring and data management		
Presenter	Claus Suverkropp	**Secondary Presenter**	

This presentation will provide an overview of the protocols used to conduct the water quality monitoring and findings from those efforts on the Sacramento River (including affects on drinking water supplies, recreation, fishing, and aquatic life). The presentation will close with next steps for SRWP and the development of a regional watershed monitoring program for the Sacramento River Watershed.

2008 NPS Conference Session Abstracts

Abstract Title	Reducing Urban Runoff with Proven Smart Irrigation Controllers	**ID**	102
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Tom Ash	**Secondary Presenter**	
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Abstract File

Abstract Text

A $1 million study in Orange County, Residential Runoff Reduction Study, reported in 2004 (MWDOC, RWQCB, IRWD)that the use of the WeatherTRAK smart irrigation controller in a contained watershed reduced runoff by 50%-71% compared to education and control watersheds.

This presentation would describe that study, and how smart controllers are now being used to reduce runoff (Newport Beach), written into legislation (Ca. AB 1881) and new developmet ordinances (Riverside County, Antelope Valley). The presentation will detail how the technology works, why it reduces runoff, how city programs are designed and implemented for runoff success.

2008 NPS Conference Session Abstracts

Abstract Title	Assessing Treatment of Runoff Pollution by Buffer Strips: The Roadside Vegetated Treatment Sites (R	**ID**	103
Topic Area	Water quality monitoring and data management		
Presenter	Maureen Mathias Kerner	**Secondary Presenter**	
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Abstract File 121310_01112008_Maureen Ma_RVTS Abstract 1-8-08.doc

Abstract Text

The Roadside Vegetated Treatment Site (RVTS) Study evaluates the effectiveness of existing, vegetated, roadside slopes (or buffer strips) in reducing pollutants from highway stormwater runoff. Conducted since 2001, the study has monitored ten test locations statewide. At each location, collection channels capture highway runoff after it passes through RVTS of varying widths. The runoff discharged from each RVTS was compared to that observed at the edge of pavement. The performance of each RVTS was evaluated in terms of the changes in pollutant concentration and the load reduction caused by infiltration.
Results collected to-date have indicated that RVTS, under certain vegetation conditions, can be considered functionally equivalent to buffer strips specifically engineered for reducing pollutant concentrations. Concentration reductions frequently occurred for TSS & total metals. Nutrient concentrations were generally unchanged. These concentration trends were observed for sites with a minimum of 65 percent vegetation. Vegetative cover was less critical for obtaining positive load removal. A substantial load reduction is evident for all constituents, even at sites with less than 65 percent vegetation.
Future activities for the RVTS Study include continued monitoring, assessing how site characteristics affect performance, and evaluating how these assessments can be incorporated into Caltrans programs to promote pollutant reduction. Finally, Caltrans is expanding the study to assess the treatment performance of side slopes vegetated with ornamental cover, such as ice plant and ivy.

2008 NPS Conference Session Abstracts

Abstract Title	Characterization of Bacterial Communities along Santa Ana River Using Several Analytical Methods	**ID**	104
Topic Area	Water quality monitoring and data management		
Presenter	Menu B. Leddy	**Secondary Presenter**	Richard M. Bold
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Abstract File

Abstract Text

The Santa Ana River (SAR) in Southern California and its tributaries convey some of the largest volume of water among all rivers in Southern California. Within the Middle SAR (MSAR), which covers approximately 488 square miles, various waterbodies are recorded as impaired for body-contact recreation. Chino Creek, a tributary of SAR, is an impaired waterbody due to pathogens and nutrients from urban and stormwater runoff and agricultural activities. The main constituents of concern are pathogens and nutrients that have impaired the use of water for beneficial use and non-contact water recreation. This study was conducted to evaluate the diversity and fluctuations of the microbial populations along the creek during wet- and dry-weather conditions. Bacterial concentrations in surface waters from a number of locations along Chino Creek and an open-space site were assessed using several different analytical methods. Membrane Filtration was used to determine the concentration of indicator organisms. Segments of the 16S rDNA genes were analyzed using TRFLP to identify the microbial communities and their diversity based on land use, seasonal and temporal shifts. Water samples were assessed to determine the occurrence of Bacteroides spp., a human-specific marker. During storm events, total and fecal coliforms exceeded REC-1 criteria for single sample. Higher densities of total coliforms than fecal coliforms were also detected. Total and fecal coliform densities during dry flows were comparable to wet flows at some of the sites along Chino Creek. Cluster analyses of TRFLP patterns demonstrated distinct groups which correlated with land use or flow from a location upstream. The cluster analysis approach can be used to differentiate between a natural bacterial signature and an urban runoff signature during storm events. Bacteroides spp. were detected at a few of the sites along the creek, but were not detected at the open-space location.

2008 NPS Conference Session Abstracts

Abstract Title	Efficacy of Constructed Wetlands in Pesticide Removal from Tailwaters in the Central Valley, CA	**ID**	105
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Robert Budd	**Secondary Presenter**	
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Abstract File

Abstract Text

Constructed flow-through wetlands have great potential to mitigate several non-point source pollutants such as pesticides. Several studies have demonstrated the effectiveness of constructed wetlands for improving the quality of irrigation tailwaters, yet there exists a need to evaluate the effectiveness of constructed wetlands ability to remove pesticides from runoff that reaches the San Joaquin River. The area of interest encompasses a 100-mile stretch of the San Joaquin River designated as an impaired water body under California's 303(d) list of impaired water bodies. Several survey studies have recognized the need to reduce pyrethroid concentrations in bed sediments. Constructed wetlands located within the Central Valley with different physical and hydrological characteristics were evaluated for pesticide removal efficiency from agricultural tailwaters. The primary objective of this project is to document the efficacy of constructed wetlands to mitigate water quality contaminants such as pesticides in agricultural return. The two constructed wetlands in this study proved effective in reducing pyrethroid concentrations in the water column, with up to 95% for permethrin and 97% for cyhalothrin. Both wetlands were less efficient at removing the organophosphates diazinon and chlorpyrifos from the water column. The majority of the total pyrethroid concentrations were found bound to suspended solids. The information provided by this study will be vital in determining future efforts focused on employing constructed wetlands as a cost effective mitigation strategy for improving water quality issues within the San Joaquin River.

2008 NPS Conference Session Abstracts

Abstract Title	Overcoming Obstacles to LID Implementation	**ID**	106
Topic Area	Other		
Presenter	Martina Frey	**Secondary Presenter**	
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Abstract File

Abstract Text

Communities facing new stormwater and low impact development (LID) requirements may find that implementing LID best management practices (BMPs) is not as easy as it seems. Sometimes LID BMP specifications conflict with existing building, plumbing, landscaping, and other development codes. To allow LID implementation, communities will need to review their codes and ordinances, identify areas of conflict, and update language. This presentation will include specific examples of common language and recommended changes, along with an overview of the process for changing codes and ordinances.

Municipalities may also encounter resistance from citizens, developers, elected officials, and staff from other municipal departments. Those not familiar with LID practices may perceive risks and pitfalls that, in reality, can be corrected with tailored outreach and early stakeholder involvement. Strategies will be presented for communicating with developers, the public, other municipal departments to overcome opposition. Such strategies include carefully crafting the message, implementing municipally owned pilot projects, providing credits and incentives for LID, incorporating LID into other “green” initiatives already underway, to name a few. Highly visual examples will be presented highlighting strategies used by other communities who have successfully tackled these issues.

2008 NPS Conference Session Abstracts

Abstract Title	Source tracking of algae seed in support of Dissolved Oxygen TMDL for the San Joaquin River	**ID**	107
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Sharon Borglin	**Secondary Presenter**	William Stringfellow
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Abstract File

Abstract Text

The State of California is instituting a total maximum daily load (TMDL) requirement for oxygen demand on the San Joaquin River (SJR) in Central California that includes algal biomass. The TMDL is driven by the low levels of dissolved oxygen in the Stockton deep water ship channel which is a barrier to fish migration to the upstream SJR. Previous studies have identified algal biomass as the most significant oxygen-demanding substance in the upstream SJR DO TMDL Project study-area. An ecosystem-scale study has been undertaken to improve both the understanding of algal seed sources and algal growth in the SJR. Significant algal concentrations are found in the upstream tributaries but the loads into the river are relatively small, and most of the algal biomass measured downstream is produced occurs when inoculated algae grow in the main stem of the SJR. Mitigating seed sources would lower the initial inoculation and inhibit overall growth downstream. Bulk parameters such as nutrients, organic carbon, and chlorophyll indicate loads but are not sufficiently specific to evaluate seed source. Phospholipid fatty acid analysis (PLFA) was performed on samples collected in the main stem of the SJR as well as the major tributaries from 2005-2007. PLFA analysis enables the detection of community specific phospholipids and provides a fingerprinting of the bulk algal community structure. The overall community in the system is predominantly diatoms with lower detection of green algae and dinoflagellates. Analysis shows that the source of algal seed is not constant but seasonally dependent.

2008 NPS Conference Session Abstracts

Abstract Title	Mattole Integrated Coastal Watershed Plan – Next Steps for a 25 Year Old Community-Based Watershed R	**ID**	108
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Jeremy Wheeler	**Secondary Presenter**	
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Abstract File 030021_01112008_Jeremy Whe_ICWMPconference abstract_jw.doc

Abstract Text

Over the last 15 years, it became clear to those involved in watershed restoration that sedimentation and elevated water temperatures are the major causes of water quality impairments in rural watersheds with a legacy of timber harvest. In the Mattole River watershed, on California's North Coast, older roads, built during the logging boom between the 1950s and 70s and used as rural residential access, are recognized as the leading cause of sedimentation in this sediment-impaired system. In response, The Mattole Restoration Council developed the "Good Roads, Clear Creeks" program, a comprehensive, systematic, large scale, community based sediment control effort that upgrades active roads, improves drainage patterns, and removes legacy roads that are no longer in use. To date the program has treated hundreds of sites in the upper and middle reaches of the watershed, stabilizing thousands of cubic yards of sediment.

The Mattole, federally recognized as 303d impaired for temperature and sediment with a completed TMDL, is populated by two ESA listed anadromous fish species and drains into the Punta Gorda Marine Protected Area and the King Range Area of Special Biological Significance (ASBS). Community-based restoration efforts, supported by state and federal agencies, have been evolving in this important watershed since the early 1980s. The Mattole Integrated Coastal Watershed Plan (MICWMP) is a collaborative effort between three community environmental groups focused on improving, restoring, and preserving a variety of habitats and conserving the working landscapes of the watershed.

In addition to the Mattole Restoration Council, which focuses on sediment control, invasive species removal and native tree planting, the MICWMP effort is joined by Sanctuary Forest Inc. who manages a number of conservation easements and owns a series of preserves containing some of the remaining old growth in the watershed. Also involved is the Mattole Salmon Group, a community based restoration group that focuses on anadromous habitat enhancement and direct intervention methods to preserve and enhance the remaining coho and Chinook salmon still spawning in the watershed.

2008 NPS Conference Session Abstracts

Abstract Title	Mattole Integrated Coastal Watershed Plan – Next Steps for a 25 Year Old Community-Based Watershed R	**ID**	108
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Jeremy Wheeler	**Secondary Presenter**	

The MICWMP represents a comprehensive and cooperative approach to watershed restoration in a sensitive coastal system. The plan includes collaborative projects combining land preservation, habitat enhancement, and landowner education to improve the water quality of the listed watershed and adjacent coastal waters.

2008 NPS Conference Session Abstracts

Abstract Title	Assessing Indicators of Boat Antifouling Paint Pollution in California Marinas	**ID**	109
Topic Area	Protecting coastal resources		
Presenter	Ellen Pyatt	**Secondary Presenter**	
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Abstract File 035412_01112008_Nan Singha_NPS 2008 Conference Abstract.doc

Abstract Text

Antifouling paints (AFPs) are commonly relied upon to deter aquatic organisms (e.g., algae, shellfish, tubeworms, and barnacles) from attaching to boat hulls. AFPs function through the slow but continuous leaching of biocides from the painted surface into the paint-water interface where fouling occurs. AFPs that are used in California typically contain one or more of the following biocides: copper oxide, copper hydroxide, copper thiocyanate, zinc pyrithione, Irgarol, and Sea-Nine. In areas of high boat density (i.e. a marina), however, the use of these biocides could result in elevated concentrations of AFP-related contaminants. These contaminants may exceed water quality standards established for the protection of aquatic life or may lead to adverse effects on the local fauna and flora.

In 2006, the Department of Pesticide Regulation (DPR) initiated a water-column study to evaluate water quality indicators of antifouling-paint use in 23 California marinas. Between July and October 2006, DPR collected hundreds of samples from marinas and associated reference sites in saltwater, brackish, and fresh water areas. All of these samples were analyzed for copper, zinc, and suspended solids. These samples were also analyzed for water quality constituents needed as inputs into U.S. EPA's Biotic Ligand Model, which predicts fresh water toxicity, and a dissolved organic carbon (DOC) regression model, which predicts toxicity in marine environments. A smaller subset of marina water samples were analyzed for Irgarol, M1 (an Irgarol degradation product), toxicity tests, and toxicity identification evaluations (TIEs).

Results showed that concentrations of dissolved copper in marinas were frequently above water quality standards (California Toxics Rule), particularly in brackish and saltwater areas. Mean concentrations of dissolved copper were higher in marinas than the adjacent local reference sites for all 23 marina areas studied, indicating that marinas were localized hotspots for copper. An evaluation of sources within the marina strongly suggests that boat AFPs are

2008 NPS Conference Session Abstracts

Abstract Title	Assessing Indicators of Boat Antifouling Paint Pollution in California Marinas	**ID**	109
Topic Area	Protecting coastal resources		
Presenter	Ellen Pyatt	**Secondary Presenter**	

likely the most significant sources of copper in the marina, particularly during periods of dry weather. Toxicity tests using a copper-sensitive test organism and endpoint occasionally showed a response. TIEs determined that copper was the likely cause of the observed toxicity.

The BLM Model predicted that there is very low likelihood of toxicity associated with the dissolved copper concentrations observed in the fresh water marinas in this study. The DOC Model predicted that toxicity associated with the dissolved copper concentrations observed could occasionally occur in some of the salt and brackish marinas in this study.

The AFP biocide–Irgarol was detected in all of the samples taken, often at concentrations that have been shown to produce deleterious sub-lethal effects on marine algae and plants. Elevated concentrations of zinc were also frequently observed in marinas although these concentrations never exceeded California's water quality standards for the metal.

Based on the findings from this study and other AFP-related investigations, DPR made several policy decisions to address elevated levels of AFP-related constituents including plans to initiate the reevaluation of AFP pesticides currently registered for use in California.

2008 NPS Conference Session Abstracts

Abstract Title	Russian River Watershed Association-Effective Multi-agency Approach to Integrated Watershed Planning	**ID**	110
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Phoebe Grow	**Secondary Presenter**	Christy Kennedy
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Abstract File

Abstract Text

The Russian River Watershed Association (RRWA) is an association of local public agencies in the Russian River Watershed that have come together to coordinate regional programs for clean water, fisheries restoration, and watershed enhancement. RRWA was created in 2003 because local water and wastewater agencies found that they were not effective addressing broad watershed issues alone or in ad hoc coalitions. Throughout its five year history, RRWA has aimed to proactively contribute to watershed-based regulation; to increase regional eligibility for watershed based funding; to educate communities about watershed stewardship; and to facilitate watershed enhancement while maximizing effective use of resources.

The Russian River Watershed is located approximately 40 miles north of San Francisco and is home to approximately 400,000 people. RRWA's nine member agencies – including the County of Sonoma, the Sonoma County Water Agency, the City of Santa Rosa and several other municipalities – are responsible for providing most of the drinking water supply, wastewater collection/treatment, and water resource protection services within the watershed.

RRWA's primary function is to facilitate integrated watershed management and several of RRWA's programs address non-point source pollution. RRWA develops and implements projects to help local governments meet requirements for clean water and other needs collectively at reduced cost. RRWA's current programs include regulatory advocacy, mercury pollution prevention, regional safe medicine disposal, watershed copper source identification, and a monthly newspaper column on watershed issues. RRWA is presently coordinating with the North Coast Regional Water Quality Control Board regarding sediment and other non-point source pollution issues in the Russian River Watershed.

RRWA has also participated in the development of the North Coast Integrated Watershed Management Plan (IRWMP). RRWA hosted a meeting in which candidate projects for

2008 NPS Conference Session Abstracts

Abstract Title	Russian River Watershed Association-Effective Multi-agency Approach to Integrated Watershed Planning	**ID**	110
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Phoebe Grow	**Secondary Presenter**	Christy Kennedy

inclusion in Round 1 of the IRMWP funding process were presented and synchronicities between projects were identified. Currently, RRWA is sheepherding the scoping process for a region-wide project which will hopefully be funded in part by Proposition 84. The project will address water quality concerns on the Russian River related to invasive species and leaking septic tanks.

RRWA's multi-agency approach benefits its member agencies and the watershed by providing a unified voice on watershed issues; broad-based political support for watershed enhancement programs; and a large resources pool for technical information, staff time and cost sharing. RRWA has proven to be a successful model for integrated watershed management and should be replicated in other areas.

2008 NPS Conference Session Abstracts

Abstract Title	TMDL Implementation: An Assessment Methodology and Sample Resultts	**ID**	111
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	John Hoornbeek	**Secondary Presenter**	Evan Hansen
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Abstract File 055059_01112008_John Hoorn_CATMDLPaperAbstract.doc

Abstract Text

Over the last decade, states throughout the country have been developing Total Maximum Daily Loads (TMDL) for impaired water bodies. These TMDL's specify the reductions in pollutant loads that are necessary to achieve compliance with water quality standards, and many of them seek to address non-point sources of water pollution. The US EPA has now approved over 24,000 TMDLs, most of which have been submitted to them by state environmental agencies. Unfortunately, little is known about the extent to which water pollution reduction activities called for in TMDL reports are actually implemented in the field.

In recent months, a research team led by Kent State University's Center for Public Administration and Public Policy has developed a methodology for assessing TMDL implementation and has been using it to assess implementation activities in Ohio and West Virginia. This presentation will review preliminary results on the extent of TMDL implementation occurring in Ohio and/or West Virginia. It will also describe the assessment methodology used, and its potential for application to other states and locations. Participants in this session will have an opportunity to learn about the methodology and the results that have flowed from its use to date. As time allows, participants will also discuss the potential use of this methodology in California and other states.

2008 NPS Conference Session Abstracts

Abstract Title	Evaluating the Effect of Phytoplankton Seed Removduction on San Joaquin River Organic Loading	**ID**	112
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Joel Herr	**Secondary Presenter**	
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Abstract File 055953_01112008_Joel Herr_Herr_CA-NPS-Conf_abstract.doc

Abstract Text

The Stockton Deep Water Ship Channel (DWSC) in California's Sacramento / San Joaquin delta is a tidal reach which experiences episodes of low dissolved oxygen impeding the passage of fish. An important cause of dissolved oxygen depletion is decay of phytoplankton produced upstream in the San Joaquin River. The Watershed Analysis Risk Management Framework (WARMF) model was applied to the San Joaquin River to determine the sources of phytoplankton and the effectiveness of various means to control the phytoplankton growth. WARMF uses meteorology, land use, measured inflows, diversion data, and irrigation practices to calculate nonpoint source load including agricultural drainage. It simulates in-stream processes including chemical reactions, sediment transport, and ion adsorption to suspended sediment particles. The model uses intrinsic properties of various species of floating algae and simulated river travel time, temperature, nutrients, and light to determine phytoplankton concentration in the San Joaquin River. WARMF has been successfully calibrated to flow and water quality data collected in the San Joaquin River from water years 2000 through 2005. Simulations indicated that phytoplankton growth was exponential and not nutrient limited, in agreement with field investigations. Preliminary simulations showed that reducing the load of phytoplankton seed in the upper reaches of the San Joaquin River would be effective at reducing the load of organic matter entering the Sacramento / San Joaquin delta.

A field experiment was conducted in July 2007 shutting off the San Luis Drain, a significant source of phytoplankton seed at the upper end of the San Joaquin River. Flow and water quality data collected before, during, and after the planned shutoff was used to simulate the events as they occurred. The WARMF model also was used to simulate a hypothetical "do nothing" scenario, under which the San Luis Drain continued to discharge normally during the time period of the experiment. The difference between the two scenarios demonstrated the benefit achieved in lowered organic loading and the potential for broader application of the phytoplankton seed reduction strategy on a short-term and long-term basis.

2008 NPS Conference Session Abstracts

Abstract Title	Sotoyome Resource Conservation District Assessment and Monitoring Program	**ID**	113
Topic Area	Water quality monitoring and data management		
Presenter	Sierra Cantor	**Secondary Presenter**	
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Abstract File 060544_01112008_Sierra Can_SRCDAMP_Abstract.doc

Abstract Text

The Sotoyome Resource Conservation District (SRCD) is a leader in the development of programs for watershed assessment, monitoring and restoration in the Russian River Watershed. Through the SRCD Assessment and Monitoring Program (AMP), SRCD staff, partners, landowners, and community volunteers have been monitoring selected Russian River tributaries since 1998. The monitoring and assessment work has served three main purposes, to engage and educate local landowners and watershed stewards, to build a monitoring data record and identify trends, and to inform and identify restoration projects to target and reduce the highest priority pollutants.

The SRCD AMP is designed to measure and ultimately improve watershed conditions through collaboration between private landowners, community groups, local organizations and public agencies. Working together to find viable solutions for the restoration of the smaller tributary watersheds one of the main goals of this program.

One component of the AMP that highlights our role as a collaborative leader is the coordination of the Russian River Temperature Workgroup (RRTW). The RRTW is an open forum composed of field practitioners formed to discuss topics and network resources regarding all things temperature monitoring related. The goal of the group is to standardize temperature data collection so that data collected by different entities is conversant, facilitate data sharing, ensure that limited monitoring resources area maximized by avoiding the duplication of efforts. The RRTW is open to any agency, organization, individual, etc. collecting continuous temperature monitoring data in the Russian River Watershed and has been meeting annually since 2002.

2008 NPS Conference Session Abstracts

Abstract Title	Lake Tahoe Water Quality Crediting Program - Accounting for NPS improvements	**ID**	114
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Jeremy Sokulsky, P.E., MB	**Secondary Presenter**	Robert Larsen
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Abstract File 061135_01112008_Jeremy Sok_Enviro Incentives CA NPS Abs Lake Tahoe.docx

Abstract Text

The Lake Tahoe regulatory agencies, municipal governments and land managers need a consistent mechanism to account for nonpoint source pollutant load reductions. Ultra fine sediment and nutrients currently impair lake clarity. Lake Tahoe agencies are developing a water quality crediting program that will define a process and methods for evaluating projects and facilitate communication between project designers, funders, permitted entities and regulators. A clearly defined water quality crediting system is being developed to 1) identify and evaluate project opportunities for prioritization, 2) track and report water quality benefits from projects, 3) account for pollutant reduction with respect to TMDL milestones, 4) enable adaptive management, and 5) support water quality trading or offsets. The crediting system will employ water quality models and standard relationships to estimate load reductions from actions as the basis for the credits generated by a project. Rapid field verification techniques will be established to evaluate actual performance and how project maintenance may impact the project credit value over time. Intensive monitoring will be performed on a subset of projects to validate and improve models and other load reduction estimation tools, and to improve the relationship between estimated load reductions accrued from past actions and the best understanding of actual pollutant load reductions. The water quality crediting system will help strategic investment of public and private funds and will translate the Lake Tahoe TMDL into meaningful terms that can be achieved through coordinated actions.

2008 NPS Conference Session Abstracts

Abstract Title	Agricultural Management Practices for Phosphorus Reduction in the Salton Sea Watershed	**ID**	115
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Khaled Bali	**Secondary Presenter**	
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Abstract File 070101_01112008_Khaled Bal_Bali NPS Conf. 2008.doc

Abstract Text

Nutrients, sediment and silt in drainage waters have been identified as the leading cause for water quality impairments in rivers and waterbodies in the State. In the Salton Sea Watershed, more than 2.8 million acre-feet of Colorado River water are used every year to irrigate approximately 500,000 acres of lands in the Imperial Valley. Approximately one-third of applied irrigation water leaves irrigated field as surface runoff and subsurface drainage. Surface and subsurface drainage water enters the Salton Sea, which has been serving as a drainage sink for the Imperial and Coachella Valleys since its formation in 1905. The Salton Sea continues to exist because of the drainage water from agriculture in Imperial and Coachella Valleys as well as flow of agricultural drainage and untreated and partially treated sewage from the Mexicali Valley. As the largest inland body of water in California, the Salton Sea provides significant habitat for fish and wildlife. Rising salinity, sediment, nutrients, and other pollutions threaten these habitats. Excessive loads of nutrients (mainly phosphorus and nitrogen) in Imperial Valley drains and rivers have contributed to the eutrophic conditions in the Salton Sea that may impair the designated beneficial uses of the Sea.

Alfalfa is the principal crop in the Imperial Valley. Approximately 1 million ac-ft of water are used every year to irrigate 150,000 acres of alfalfa. Approximately 20 million pounds of phosphorus (P) may be used annually to fertilize alfalfa in the Imperial Valley. In this project, we implemented seven standard and improved irrigation and fertigation management practices on a commercial alfalfa field to reduce the load and concentration of phosphorus and sediment in drainage waters. We evaluated the impact of each management measure on the load and concentration of phosphorus and sediment in drainage water. The most effective measures were irrigation management and runoff control. Reducing the amount of surface runoff after the application of P fertilizer is a key factor in reducing the load of P in drainage waters. The loads of P in runoff waters were reduced by as much as 75% compared to normal irrigation and fertigation practices. Irrigation management is a key factor in controlling the

2008 NPS Conference Session Abstracts

Abstract Title	Agricultural Management Practices for Phosphorus Reduction in the Salton Sea Watershed	**ID**	115
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Khaled Bali	**Secondary Presenter**	

concentration and the load of P discharged from irrigation fields in the Imperial Valley. Water-run application of P increased the concentration and load of P in runoff water by almost 100% compare to broadcast P applications. Avoiding water-run applications can reduce the load of P in runoff water by more than 50%. Implementing other management practices may result in further reduction in P load in runoff waters.

2008 NPS Conference Session Abstracts

Abstract Title	Overcoming Obstacles to the Implementation of Regional Treatment Best Managemement Practices (BMPs)	**ID**	116
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Jeremy Jungreis	**Secondary Presenter**	Mary Lynn Coffee
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Abstract File

Abstract Text

Proposed 90 minute panel is for one moderator and four panelists, with each panelist giving a 15-20 minute presentation. Presentations will be followed by a 15 minute moderated question and answer session.

Regional Best Management Practices (BMPs) can be an effective tool to manage water quality and improve the compliance of surface waters with water quality standards and Total Maximum Daily Loads (TMDLs). They can also be useful tools in the management and reduction of nonpoint source pollution loadings. Although there may be significant water quality benefits and cost savings to be gained from incorporation of regional BMPs into watershed planning, there are also significant legal, technical and practical challenges that must be addressed before these regional BMPs may be effectively implemented. This panel presentation will discuss the pertinent legal framework under the Clean Water Act and California Porter-Cologne Water Quality Control Act for the implementation of regional and shared BMPs. It will also provide insight into the perspectives of the regulated community, and the views of stakeholders that are responsible for implementing the BMPs and enforcing water quality standards, by exploring challenges associated with effective implementation and operation of regional and shared BMPs. Panelists will provide this insight by utilizing examples of successful BMP implementation in Southern California. Case study discussion may include a discussion of how BMPs for the removal of nutrients, selenium and toxins were implemented in Orange County watersheds—such as the San Joaquin Marsh, the San Diego Creek Sediment Basins, and other portions of the Newport Bay Watershed. Finally, this panel will consider potential environmental impacts associated with implementation of regional BMPs, including potential impacts on species and water quality, and how adverse impacts may be avoided via stakeholder interaction (and problem solving) among regulators, NGOs and the regulated community.

2008 NPS Conference Session Abstracts

Abstract Title	Overcoming Obstacles to the Implementation of Regional Treatment Best Managemement Practices (BMPs)	**ID**	116
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Jeremy Jungreis	**Secondary Presenter**	Mary Lynn Coffee

Moderator: Jeremy Jungreis, Nossaman Guthner Knox & Elliott LLP

Secondary Presenter: Mary Lynn Coffee, Nossaman Guthner Knox & Elliott LLP(Legal overview of Clean Water Act/Porter Cologne and other pertinent regulations associated with construction and implementation of regional BMPs).

Additional Presenters:
1) Regulatory Agency Representative
2) Non Governmental Organization Representative
3) Water Quality Consultant

Potential speakers could include Joanne Schneider, Terri Reeder or other appropriate personnel from SARWQB.

Potential speakers could include a representative from Orange County Coastkeeper or the Surfrider Foundation.

Potential speaker would be from a technical background, and have experience in the design/construction/implementation of regional BMPs.

2008 NPS Conference Session Abstracts

Abstract Title	Characterizing surface runoff from single-family residential drainsheds	**ID**	117
Topic Area	Water quality monitoring and data management		
Presenter	Lorence Oki	**Secondary Presenter**	Darren Haver
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Abstract File

Abstract Text

In a statewide collaborative project, the runoff from four (4) neighborhoods in Sacramento County and four (4) in Orange County is monitored on a year-round basis. The two main objectives of this project are to: 1) characterize the runoff from these residential drainsheds and 2) determine the effect of intensive outreach activities to reduce runoff volumes and the pollutants in the runoff that may be generated from landscape maintenance activities.

The process used to select these sites included overlaying county parcel data onto aerial maps to identify areas with homes between 4-16 years old. County storm drain maps were then overlayed onto those areas to locate storm drain outfalls, demarcate drainsheds, and determine the land uses within the drainsheds upstream of the outfalls. Candidate monitoring sites were identified with specific characteristics: outfalls that are easily and safely accessible; runoff can be collected directly from the end of the storm drain before it enters a ditch, stream, pond, etc.; presence of summer flows; and drainsheds consisting only of single-family residences. Altogether, the eight sites selected consist of more than 2,000 homes.

Grab samples are taken at each site every 1-2 weeks by UC staff or Cooperative Extension Master Gardeners (MGs). Field data are also recorded during sampling. Sample collection began in Sacramento County in July 2006, in October 2006 in Orange County, and will continue through 2008. All samples are analyzed to determine levels of: a) pathogens including Giardia, Cryptosporidium, total coliform bacteria, and pathogen surrogates such as enterococci, male-specific coliphages, coliphages, and Clostridium perfringens; b) nutrients (nitrate, TKN, phosphate, total P); c) components of drinking water quality standards including: organic carbon (TOC & DOC), bromide, chloride, total dissolved solids (TDS), total suspended solids (TSS), turbidity; and d) the pesticides: diazinon, chlorpyrifos, synthetic pyrethroids (esfenvalerate, bifenthrin, permethrin, cyfluthrin, and cypermethrin), and the increasingly more popular ant control insecticide, fipronil.

2008 NPS Conference Session Abstracts

Abstract Title	Characterizing surface runoff from single-family residential drainsheds	**ID**	117
Topic Area	Water quality monitoring and data management		
Presenter	Lorence Oki	**Secondary Presenter**	Darren Haver

Equipment installed at each site includes a data logger collecting runoff data including depth, velocity, pH, conductivity, temperature. Rainfall is also recorded. Runoff samples from the first few storms of the season are collected utilizing auto samplers programmed to be activated by rainfall rate. The pacing of sample collection is calculated using weather forecasts and surface characteristics of the drainshed.

Outreach is provided to homeowners within 2 “test” sites in each county with the assistance of the MGs in the respective counties. Outreach activities include the distribution of printed materials, neighborhood workshops coordinated with local agencies, and personalized guidance by the MGs. A survey of awareness was conducted prior to the initiation of the outreach. Runoff monitoring and outreach will continue concurrently. Objectives for this portion of the project include determining the effectiveness of the outreach activities by changes in awareness of low impact landscape maintenance methods and reductions in pollutant loads from the residences within the “test” areas.

2008 NPS Conference Session Abstracts

Abstract Title	Pesticide detections in irrigation and stormwater runoff from single-family residences.	**ID**	118
Topic Area	Water quality monitoring and data management		
Presenter	Darren L. Haver	**Secondary Presenter**	Lorence Oki
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Abstract File

Abstract Text

In a statewide collaborative project characterizing the runoff from single family residences, 4 neighborhoods in Sacramento County and 4 in Orange County have been selected for monitoring based on their size, type and age of homes, drainage conditions, and lack of other land-use types. Runoff samples are being collected every 1-2 weeks at drainage outfall sites in those neighborhoods that contain a total of more than 2,000 homes. Runoff samples from the first few storms of the season are also collected. Sample collection began in Sacramento County in July 2006, in October 2006 in Orange County, and will continue through 2008. All samples are analyzed for a suite of pesticides that includes 2 organophosphates, 8 pyrethroids, and fipronil. Drinking water constituents of concern, nutrients, and pathogen indicators, are also analyzed to provide a complete picture of contaminants found in residential runoff. Equipment is installed at each sampling site to monitor and record flow velocity, depth, pH, conductivity, temperature, and rainfall.

The pesticides selected for analysis are typically used to control ants and termites. More than 60% of all pesticides used in urban applications are for ant control. Pyrethroids have been the most widely used materials recently, but the use of fipronil, a newer pesticide, is rapidly increasing. The reported use of fipronil in CA was just a few pounds in 2000, but exceeded 70,000 lbs in 2005. Fipronil is known for its aquatic toxicity to certain aquatic invertebrates. For instance, the LC50 of fipronil is only 0.14 ppb for mysid shrimp and 0.32 ppb for grass shrimp. In addition, degradation of fipronil produces three metabolites that all have higher acute toxicities than fipronil.

Of the pyrethroids, bifenthrin, permethrin, and cyfluthrin are consistently found in the runoff samples, with cypermethrin and cyhalothrin detected less frequently. Higher concentrations are found in storm runoff samples than in dry season and non-storm runoff samples. The levels of these pesticides appear to correlate with suspended solid content of the runoff

2008 NPS Conference Session Abstracts

Abstract Title	Pesticide detections in irrigation and stormwater runoff from single-family residences.	**ID**	118
Topic Area	Water quality monitoring and data management		
Presenter	Darren L. Haver	**Secondary Presenter**	Lorence Oki

water. Contribution from storm runoff likely dominates the overall pesticide export. Recent studies in California have attributed sediment toxicity in urban streams to contamination of pyrethroid insecticides. The detection of these pesticides in runoff provides the first direct evidence that pyrethroid products used by homeowners and professional applicators contribute to the presence of these pesticides in urban streams.

At two sites in Sacramento County, fipronil and its three metabolites are consistently found in the runoff. At two sites in Orange County, fipronil and metabolites are present at levels much higher than the LC50 for mysid shrimp. This is the first evidence of fipronil and its metabolites in urban runoff.

Given the increasing use of pyrethroids and fipronil for landscape maintenance and structural pest management, these findings may have significant implications for water quality protection in urban and coastal watersheds. Management and mitigation strategies will need to be developed to not only reduce pesticide movement into surface waters, but effectively control nuisance pests in urban environments.

2008 NPS Conference Session Abstracts

Abstract Title	Watershed Assessment & Investigation of Non-Point Source impacts on the Trinidad Kelp Bed ASBS	**ID**	119
Topic Area	Protecting coastal resources		
Presenter	Rebecca Crow	**Secondary Presenter**	Bob Brown
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Abstract File 072727_01112008_Rebecca Cr_NPS Conference Abstract SPC edits_rc.doc

Abstract Text

This presentation will focus on the use of the watershed planning process to protect coastal resources through nonpoint source water quality monitoring and analysis. The City of Trinidad, with many other local, state, and federal agencies as well as private companies and citizens, is undertaking the development of an Integrated Coastal Watershed Management Plan (ICWMP) for the Trinidad Kelp Beds ASBS (Area of Special Biological Significance). The ICWMP is being funded by the State Water Resources Control Board Program funded by Proposition 50.

The City and its partners are currently involved in an extensive water quality sampling and assessment program to address nonpoint source impacts to the ASBS. The primary identified nonpoint pollutant sources in the area were stormwater discharge and stream and river outlets, springs, and seeps contaminated by poorly functioning onsite wastewater treatment systems (OWTS) or septic systems. Of particular interest to the City was pollutant loading resulting from OWTS. There are no centralized wastewater facilities in the City and surrounding unincorporated areas.

Initially it was believed by the City, regulatory officials, and other stakeholders that the OWTS were contributing significant pollutant loads to the ASBS, particularly during the wet-weather season. However, sampling has shown that this may not necessarily be the case.

The water quality monitoring program for the development of the ICWMP included the establishment of baseline water quality data for potential nonpoint source pollutants discharged to the ASBS. Water quality samples were collected from six different coastal watersheds in the area ranging from light urban to residential to rural. Two concurrent monitoring efforts were conducted;
1. Stormwater monitoring which included the City stormwater system and non-point source

2008 NPS Conference Session Abstracts

Abstract Title	Watershed Assessment & Investigation of Non-Point Source impacts on the Trinidad Kelp Bed ASBS	**ID**	119
Topic Area	Protecting coastal resources		
Presenter	Rebecca Crow	**Secondary Presenter**	Bob Brown

locations in rural road ditches,
2. Lower watershed areas focusing on OWTS contributions measured near the mouths of streams.

Three separate storm events were sampled and analyzed for pH, EC, phosphates, nitrates, turbidity, total/fecal coliform, and Enterococcus. Stormwater sample results indicated elevated total/fecal coliform and Enterococcus levels. Many of the samples collected exceeded applicable water quality criterion for water contact recreation. As intuitively expected, the sampling of wastewater indicator bacteria showed a trend toward higher concentrations in more developed watershed areas. However, low density developed watersheds also had high bacteria concentrations in water samples.

One surprising result from the sampling was that nutrient sample results were low to non-detect and did not show a correlation with higher wastewater indicator bacteria concentrations, suggesting that the bacteria concentrations were not necessarily related to OWTS. This may suggest significant contribution by wildlife, agricultural animals and pets.

To further assess the relative contribution of OWTS to nonpoint source pollution, source tracking is being conducted. A fluorometer calibrated to identify optical brighteners typically found in laundry detergents is being used to identify areas more greatly impacted by OWTS. As part of the completed ICWMP, an action plan will be developed which will include targeting OWTS assessment is areas identified with greater impacts from OWTS. This along with other strategies identified in the Action Plan will protect water quality in the ASBS.

2008 NPS Conference Session Abstracts

Abstract Title	Ski Area Erosion Control Via Multi-Stakeholder Collaboration	**ID**	120
Topic Area	Other		
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Sediment is a major water pollutant in the Western United States today. Wherever development takes place, disturbed areas are prone to sediment movement. Ski resorts are no exception. Large cut and fill, steep graded ski runs, can pose a serious threat to nearby waterways. Unfortunately, effective methods to control erosion for drastically disturbed alpine areas have not been well researched or documented. Despite a long list of 'BMPs', or recommended 'best management practices', attempts to stabilize disturbed alpine areas continue to produce inconsistent results; this lead to tension between regulatory agencies and ski area managers.

Many tensions over erosion issues between regulatory and ski area managers were due to the lack of good information on how best to control sediment in highly disturbed alpine areas. The California Alpine Resort Environmental Cooperative (CAREC) came together in 2003 to develop a process for planning and implementing erosion control projects and to experiment, through field plots, with various approaches to control sediment on site and thus reduce erosion. CAREC is a collaborative partnership that includes representatives from ski resorts, Lahontan Regional Water Quality Control Board, US Forest Service, Tahoe Regional Planning Agency, consulting firms, Integrated Environmental Restoration Services and the Sierra Business Council.

The purpose of the partnership is to use field plots to develop on-the-ground practices to better manage erosion and maximize sediment source control on ski area properties. The underlying philosophy is that a collaborative approach between land managers, field practitioners and regulators is the best way to develop an effective, functional and workable set of practices that parties can adapt to fit their needs while greatly enhancing their ability to control sediment in ski areas. The group meets two to three times a year to share field trial results and challenges. The field plots have been on the ground for several seasons and one product of the field monitoring is a Sediment Source Control Handbook that will be used by professionals in the field to guide erosion control and prevention decisions at ski resorts and

2008 NPS Conference Session Abstracts

Abstract Title	Ski Area Erosion Control Via Multi-Stakeholder Collaboration	**ID**	120
Topic Area	Other		
Presenter	Krissy Gilbert	**Secondary Presenter**	
	beyond.		

2008 NPS Conference Session Abstracts

Abstract Title	Biological Integrity of streams in San Diego County since 1996	**ID**	121
Topic Area	Water quality monitoring and data management		
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Abstract File 104358_01112008_Lilian Bus_Bioassessment San Diego NPS Conf final.doc

Abstract Text

The biological assessment monitoring program for wadeable streams in the San Diego region started in 1996. This program is based of measurements of the benthic macroinvertebrate community and its physical/habitat structure and therefore evaluates the biological and physical integrity of streams in the San Diego Region. Bioassessments integrate the effects of changing water quality conditions over time and are sensitive to multiple aspects of water and habitat quality. In the course of ten years of work in this assessment, 425 bioassessment samples were taken throughout the San Diego region. In 2005, a benthic macroinvertebrate index of biotic integrity (B-IBI) was developed for Southern Coastal California streams. Based on this B-IBI, analysis of 75% of all samples would score the pertinent stream reaches as being in ”Poor” or “Very Poor” condition. Only 25% of analyzed samples resulted in scoring of sampled stream reaches as being in “Fair” or “Good” conditions. The B-IBI scores are usually higher at locations that are higher up in the watershed and lower at the end of watersheds. The B-IBI scores show a seasonal trend with higher values in fall. Since 1996, the biological integrity of streams did not change. To explain the poor conditions in San Diego Streams, the effects of physical habitat and chemical stressors on the biological integrity of the streams will be discussed.

2008 NPS Conference Session Abstracts

Abstract Title	TMDL Implementation, BMAP Process, and Restoring Lake Hunter Watershed, Polk County, Florida.	**ID**	122
Topic Area	TMDL implementation/restoring impaired water bodies		
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Beginning in 2001, an assessment of Lake Hunter—which is located in downtown Lakeland (Polk County) in the Hillsborough River Basin—was carried out as part of the Florida Department of Environmental Protection's (FDEP) watershed management approach for restoring and protecting water resources and addressing Total Maximum Daily Load (TMDL) Program requirements. Lake Hunter was verified as impaired for nutrients and was placed on the Verified List of Impaired Waters for the Hillsborough River Basin in May 2004, because its Trophic State Index (TSI) was persistently above the state's threshold value of 60, averaging 80 from 1991 through 2002. Elevated TSI values are associated with the growth of blue-green algae and low dissolved oxygen (DO) content, and can result in conditions that are unfavorable for fish and other wildlife. TMDLs must be developed and implemented for all impaired waters in Florida, unless the impairment is documented to be a naturally occurring condition that cannot be abated by a TMDL, or unless a management plan already in place is expected to correct the problem. A TMDL represents the maximum amount of a given pollutant that a waterbody can assimilate and still meet the waterbody's designated uses. Lake Hunter is a Class III waterbody with a designated use of recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife. This paper reviews the 2004 TMDL developed for Lake Hunter, describing historical and current conditions, the lake's hydrology and water quality, and the nutrient TMDL and pollutant loading. It then provides conclusions and recommendations for guiding the implementation of a Basin Management Action Plan (BMAP) to restore and protect the lake's water quality.

Understanding the loading and flow dynamics of the lake is crucial to guiding restoration efforts. This paper discusses the following short-term actions to improve the lake's water quality: (1) Fertilizer loading is the largest single source of nutrients to Lake Hunter basin, contributing about 60 to 75 percent of the nitrogen and 79 to 93 percent of the phosphorus. (2) Lakes Wire and Beulah, which are major contributors to Lake Hunter inflows, have been

2008 NPS Conference Session Abstracts

Abstract Title	TMDL Implementation, BMAP Process, and Restoring Lake Hunter Watershed, Polk County, Florida.	**ID**	122
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Chandy V. John Ph.D.	**Secondary Presenter**	

significantly influenced by land use changes in the watershed. Short-term actions to divert flows from Lakes Wire and Beulah to the wetlands on the north side of Lake Hunter may help to improve water quality in the lake and provide flexibility in managing water levels. During the next phase, the project team will also investigate the use of no-wake zones in hot spot areas of the lake to minimize the internal loading of nutrients to Lake Hunter.

This paper recommends additional data collection and modeling, particularly for ground water and surface water nutrient loading and lake water levels. Additional modeling is essential to gaining greater insight into hydrologic and nutrient loads to the lakes and assisting in selection of cost-effective management alternatives. The proposed modeling would provide a more detailed representation of upland hydrologic and loading rates than previous modeling and would quantify ground water and surface water sources of nutrients.

2008 NPS Conference Session Abstracts

Abstract Title	Rapid Project Prioritization, Verification & Maintenance Process for Lake Tahoe Water Quality Credit	**ID**	123
Topic Area	Assessing and evaluating project success		
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Abstract File 033146_01122008_Jeremy Sok_CA NPS RAM Abs Lake Tahoe.doc

Abstract Text

The municipal governments and forest managers in the Lake Tahoe Basin need tools to prioritize how to strategically invest tens of millions of dollars per year on projects to reduce nonpoint sources of fine sediment and nutrients from entering Lake Tahoe. Further, implementation of the Lake Tahoe Total Maximum Daily Load (TMDL) will require entities to estimate and verify load reductions from projects in order to show compliance with TMDL load reduction milestones. The funding and regulatory entities in the Lake Tahoe Basin are developing a rapid assessment methodology to 1) perform desktop GIS analyses to identify areas of relatively high pollutant loading risk, 2) quickly assess pre-project conditions in order to refine the risk assessments and establish pre-project conditions, 3) verify post-project conditions compared to modeled conditions, and 4) identify when projects should be maintained in order to keep them operating according to design. The rapid assessment methodology will be based on a conceptual model that will be consistent with project scale water quality models used to estimate pollutant load reductions. Both the conceptual model and the specific rapid assessment criteria will be developed collaboratively with project implementer, funding and regulatory agency staff in order to ensure that the underlying logic and the specific methodology will be used and trusted by all parties. Project assessments will produce replicable documentation of conditions, such that independent parties will be able to perform verification assessments that will result in very similar results. All assessments will be stored in a relational database and serve as documentation that projects have been completed to specifications for purposes of assigning water quality credit related to the TMDL. The rapid assessment methodology will streamline communication between project implementers, reviewers and regulators to quickly narrow issues and identify specific areas of concern that can be efficiently addressed.

2008 NPS Conference Session Abstracts

Abstract Title	Development of Integrated Regional Water Management Plan in the Greater Los Angeles County Region: Process, achievements, and lessons learned	**ID**	124
Topic Area	Integrated Watershed Management Plan (IRWMP)		
Presenter	Hector Bordas, P.E.	**Secondary Presenter**	
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Abstract File

Abstract Text

The Greater Los Angeles County Region (Region) comprises 5 sub-regions, spanning from Ventura County to Orange County, including portions of both, and from the coastline to the San Gabriel Mountains, an area representing approximately nine million people and over 2,200 square miles. A consortium of local agencies and organizations have collaborated and held public workshops to develop an Integrated Regional Water Management Plan (IRWMP or Plan), which includes a series of projects that will help reduce non-point source water pollution and dependency on imported water, conserve water supply, increase native habitat areas, open space and parkland, and organize stakeholders of the various area watersheds, all while maintaining and enhancing flood protection. This Plan will help the Region to achieve its regulatory and community needs.

This process was partially funded through Proposition 50. In addition, a $25 million grant was awarded to the Region for 13 of its projects. Implementation of these projects is currently underway. The passage of Proposition 84 in November 2006 has opened up several opportunities for the Region to apply for additional funding.

Since February 2006, a tremendous amount of efforts has been invested to build a broad coalition of over 400 local agencies and organizations and to hold public workshops to develop the IRWMP. This multi-agency process was undertaken to combine efforts, develop partnerships, find cost-effective solutions, and to identify projects. Many lessons have been learned during this difficult endeavor.

2008 NPS Conference Session Abstracts

Abstract Title	Long-term plan for surface water quality improvement by the County of Los Angeles: Capital improvement, comprehensive monitoring, and reliable funding source	**ID**	125
Topic Area	1. Developing Water quality improvement plan 2. Local funding sourc		
Presenter	Youn Sim	**Secondary Presenter**	Hector Bordas
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Abstract File

Abstract Text

Non-point urban storm water runoff has been identified as a major cause of degradation of rivers and streams with metals, organic chemicals, and pathogens. The County is dedicated to improving the surface water quality by developing proactive and comprehensive watershed management strategies. To achieve this, the County has initiated three major projects for the entire county area: capital improvement plan, comprehensive water quality monitoring plan, and reliable long-tern funding source development.

The countywide master plan for capital improvement is to address a full range of water quality improvement strategies in all regulated water bodies within the County. Some of the key components such as quantification of existing pollutant loads and development of most cost-effective pollutant reduction measures are thoroughly investigated based on highly scientific tools. The pollution control measures involve capturing (and subsequent treatment) of urban runoff at a local (neighborhood) or regional scale. These measures are critical for regulatory compliance with Total Maximum Daily Loads and the County's municipal stormwater discharge permit.

In conjunction with the capital improvement plan development, efforts are focused on developing a countywide comprehensive water quality monitoring plan. The monitoring plan will serve dual purposes; evaluation of overall water quality improvement progress and individual evaluation of pollution control measure effectiveness.

As water quality standards become more stringent, costs involved for water quality improvement continue to increase. Existing studies indicated that necessary costs could range from $54 billion to $102 billion. The County is initiating the development of a stable and long-term regional funding mechanism that would finance the construction, operation, and

2008 NPS Conference Session Abstracts

Abstract Title	Long-term plan for surface water quality improvement by the County of Los Angeles: Capital improvement, comprehensive monitoring, and reliable funding source	**ID**	125
Topic Area	1. Developing Water quality improvement plan 2. Local funding sourc		
Presenter	Youn Sim	**Secondary Presenter**	Hector Bordas

maintenance of local and regional projects that provide surface water quality improvements. The process involves in-depth analysis of surface water pollution in the County; assessment engineering; evaluation of property owner perception related to urban and stormwater runoff; assessment of the fiscal needs of cities in the County related to surface water quality; and development of appropriate policy and strategy.

2008 NPS Conference Session Abstracts

Abstract Title	Native Gardening - No pollution, and zero water waste	**ID**	194
Topic Area	Implementing agricultural, urban and other pollution control measures		
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Abstract File 125637_01152008_Alrie Midd_Water Conf 02 08 submission.doc

Abstract Text

ECO-GARDEING IN CALIFORNIA

Water use is critical, and it is essential that the home owner re-connects back to the landscape in which they are a part of. California has the opportunity to prevent a disaster, rather than react to it; by the way we respond to our individual use of water. Native landscaping is an essential tool to help save California from water crisis. Millions of gallons a year are wasted on irrigation run-off, which becomes polluted with non-point source pollution such as fertilizer and pesticides. Some of the goals and impacts to the environment, if native gardening is encouraged and developed are:

- Reduce household water use by 50% in California.
- Restore local ecologies in the urban environment and provide additional improved habitat for biological diversity.
- Significantly reduce household pesticide, herbicide and phosphate based fertilizer use.
- Reduce the impact of invasive species on the economy of California.
- Reduce electrical household use by 10% (more than 60% of our electricity comes from fossil fuels).
- Reduce labor costs for landscape maintenance by 50% (Cost Benefit Analysis Study Mercury News Campus).
- Create new jobs for the landscape industry – turf replacement, irrigation retrofitting, garden management, eradication of invasive species, and installation of native plants.
- Create opportunities for new growth in the nursery industry – introduction of thousands of new plants species, selections, and hybrids.
- Reduce the CO2 emissions in California by reducing cement production (cement manufacture is the number 2 contributor to global warming).
- Improve water quality by retaining rainfall onsite, reducing storm run-off and reducing water

2008 NPS Conference Session Abstracts

Abstract Title	Native Gardening - No pollution, and zero water waste	**ID**	194
Topic Area	Implementing agricultural, urban and other pollution control measures		
Presenter	Alrie Middlebrook	**Secondary Presenter**	

pollution to streams and bay.
- Reuse of construction and manufactured materials including recycled wood, plastic, concrete, asphalt, and steel.
- Educate the next generation about the value of preserving habitat while simultaneously providing renewable resources for maintaining a higher quality of life.

2008 NPS Conference Session Abstracts

Abstract Title	Meadow and Stream Restoration in the Truckee River Watershed	**ID**	195
Topic Area	TMDL implementation/restoring impaired water bodies		
Presenter	Beth Christman	**Secondary Presenter**	
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Merrill and Davies are adjacent watersheds in the northern Sierra Nevada, located in the northeastern portion of the Truckee River watershed. The Truckee River flows from Lake Tahoe to Pyramid Lake in Nevada and is included on the California 303(d) list as impaired for fine sediment. These watersheds contain extensive meadow habitat that has been severely degraded through past management activities. Most notably, numerous railroad grades were constructed in the early 1900s to support logging operations. During railroad construction and operation, streams were straightened and/or diverted, leading to an increase in active erosion and decrease in meadow habitat.

I will discuss restoration work that has taken place in the Merrill and Davies watersheds. The Merrill Davies project has thirteen identified restoration sites within the two watersheds. Restoration goals are to reduce active erosion, reduce the potential for future erosion, improve the quality of surface runoff by improving surface filtration, restore floodplain function, increase flood attenuation potential, increase seasonal groundwater storage, and improve and increase riparian habitat in the area.

Thus far, restoration has been completed at 6 sites with 319h, Prop 13, and private foundation funding. The Truckee River Watershed Council and the U.S. Forest Service have partnered to complete the work. Work to date has included removing approximately 10,125 feet of railroad grade and old roads, and restoring 4,550 feet of stream to original channels. Restoration work began in 2005. Volunteers have assisted with re-vegetation and mulching during our annual community work day, Truckee River Day, every year since 2005. Monitoring of groundwater levels, vegetation, and bioassessment was begun at three sites. All sites are being photo-monitored.

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Abstract Title	La Jolla Shores Coastal Watershed Management Plan and ASBS Protection Model	**ID**	266
Topic Area	Protecting coastal resources		
Presenter	David Pohl, P.E., Ph.D.	**Secondary Presenter**	Meleah Ashford
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Abstract File 082931_01182008_David Pohl_NPS_LJASBS Abstract-.doc

Abstract Text

As impacts to California's marine environment and Areas of Special Biological Significance (ASBS) issues come to the forefront, there is a need to develop the science of ocean protection processes and to expand marine conservation stewardship programs. In response to tightened regulatory requirements and in recognition that ocean protection and stewardship are not only critical to, but also a part of their mission, Scripps Institution of Oceanography (SIO), the City of San Diego, University of California San Diego (UCSD) and San Diego Coastkeeper developed a collaborative, science-based coastal watershed management plan aimed at protecting the only two ASBS in San Diego County. The La Jolla Shores Integrated Coastal Watershed Management Plan (Plan) outlines and implements an ASBS Protection Model for ocean protection that focuses management measures on reducing the impacts of non-point source dry weather urban runoff and storm flows to the marine environment. Impacts from near-shore current cross contamination and aerial deposition are also being assessed as part of the Protection Model process.

The iterative Protection Model process has used the data collected as part of the investigation phase to develop management measures to reduce the identified sources of impacts. The Model results have lead to a phased implementation approach for management measures to address identified dry and wet weather urban runoff impacts, while at the same time providing essential data to guide future implementation of management efforts. The iterative Protection Model is unique in that it incorporates ongoing monitoring and special study assessment data to provide a sound scientific basis for management implementations and the assessment of the effectiveness of these measures. The Plan also includes recommendations for long-term ASBS ecosystem monitoring and information management program that can be used state-wide to assess ASBS performance and support management decisions to protect the overall marine environment. Finally, the Plan includes a comprehensive ocean stewardship program, recognizing that ultimately, it is the local and regional communities that must

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embrace efforts to protect the La Jolla Shores ASBS since often it is their actions that have a significant impact on the quality of the runoff within the watershed and to the marine environment.

This talk will focus on how the ASBS Protection Model has used results from monitoring and assessment programs previously conducted in the La Jolla Shores Coastal Watershed to design a comprehensive Management Plan that addresses current and future impacts to ASBS and the marine environment. It will also include discussion of the assessment tools used to evaluate the effectiveness of the management actions in reducing the impacts to the ASBS. These tools include water quality monitoring programs that are underway to assess the effectiveness of Best Management Practices that include low impact development techniques, aggressive street sweeping, erosion and sediment controls and pollution prevention and source control programs. In addition to water quality monitoring, ecological assessment monitoring includes bioaccumulation and biological surveys to assess the effectiveness of these measures in the marine environment. The methods used for these assessments are being coordinated with state-wide monitoring programs to allow for comparisons to other ASBS. The talk will therefore be of interest to watershed managers in and near ASBS and Protected Marine Areas by providing the insight into the ASBS Protection Model and the methods used to assess the effectiveness of a phased approach to management measure implementation.

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2008 NPS Conference Session Abstracts

Abstract Title	Assessing Impacts to Areas of Special Biological Significance	**ID**	267
Topic Area	Protecting coastal resources		
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Abstract Text

In recent years, the California State Water Resources Control Board has increased efforts to protect the 34 designated coastal Areas of Special Biological Significance (ASBS). As the effects of point and nonpoint source impacts (e.g. dry and wet weather runoff, contamination from adjacent coastal waters, and physical impacts by tidepool visitors) on coastal waters become increasingly identified and regulated, refined tools are needed for water resource managers to assess multiple sources of impact. In addition, tools are required assess the effectiveness of management actions to reduce the identified sources of impacts. For example, such a tool can be used to assess and differentiate the impacts from dry weather flows and the benefits achieved from the implementation of management measures such as dry weather diversions.

This paper presents an assessment of several sources of impact to the nearshore waters and rocky intertidal habitat of three ASBS in central Orange County through the development and implementation of a weight-of-evidence tool. The “impact metric” tool employs an impact-based approach to assess potential impacts from direct dry and wet weather flows as well as impacts from cross-contamination, public use activities, invasive species, and environmental changes. These impacts are differentiated using a weight of evidence approach and indicator species that are sensitive to one or more of the potential impacts. This approach can be used to assess the frequency and biological significance of different impact types using disparate datasets such as water chemistry, biological monitoring, bioaccumulation, toxicity bioassays and public use monitoring. A weighting system is then used to assess and compare the relative importance of the various impacts to individual species and the ASBS as a whole.

Results from field and laboratory studies conducted in the Robert E. Badham, Irvine Coast and Heisler Park ASBS will be presented to highlight the functionality of the “impact metric” tool and to assess the relative importance of various point and nonpoint source impacts to these ASBS.

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Presenter	Bryn Evans	**Secondary Presenter**	David Pohl

It is envisaged that the impact metric tool will be used to prioritize management actions based on the severity and ecological effect of anthropogenic impacts. An overall strategy is to develop a tool to assist watershed management planning such that marine life within ASBS is protected from key impacts and to measure the effectiveness of those management strategies. The impact metric tool and the results it presents for the Orange County ASBS will be of interest to all water resource managers adjacent to, or impacting on, ASBS.

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2008 NPS Conference Session Abstracts

Abstract Title	Making Local Regulations "LID-Friendly" - A Case Study of One California Community	**ID**	408
Topic Area	Low Impact Development		
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Local regulations are often identified as a significant impediment to Low Impact Development (LID). In some cases, these regulations prohibit or discourage certain LID techniques by requiring special permits or variances. Perhaps more commonly, ordinances are silent on the approach, leaving planning commissions, plan reviewers, and developers to rely on the "conventional" approaches to stormwater or site design.

Simple modifications to local codes can encourage builders and property owners to apply LID techniques, while also ensuring high quality development, adequate access, and public safety. A comprehensive review of local codes can help to create a predictable, streamlined process that encourages developers to try LID techniques.

This presentation will demonstrate how a California community can change local zoning codes and ordinances to incorporate low impact development practices. Regulatory barriers and opportunities will be identified and organized by the following low impact development principles:

- Conserve natural resources that provide valuable natural functions associated with controlling and filtering stormwater
- Minimize & disconnect impervious surfaces
- Direct runoff to natural and landscaped area conducive to infiltration
- Use distributed small-scale controls to mimic the site's pre-project hydrology